Statement of Qualifications

Photogrammetry and LIDAR Services

Geographic Information Systems

CAD Services

SECON Private Limited

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1. Profile

SECON Private Limited is an ISO 9001:2008 certified, NABL Accredited, GIS Driven Multidiscipline Engineering Company. SECON is a financially sound, stable, zero-debt Company that was established in 1981. SECON is one of the leading multidiscipline engineering consulting firms and the largest and oldest Land Surveying and Mapping firm in India. Most of SECON's clients are repeat and long-term clients.

The key differentiator for SECON is that the company is a well-established (established in 1981) financially stable (Zero Debt and Consistently Profit Making) Multidiscipline Mapping and Engineering firm that provides a total solution from a single window for the entire lifecycle of an Infrastructure development project.

The domain expertise of SECON compromises:

Design Consultancy and Engineering Services	Investigation and Services
1. Water, Sanitation and Storm water Engineering(Public Health Engineering) 2. Highway Engineering and Construction Supervision. 3. Irrigation, Flood Control and Water Management. 4. Electrical Network Distribution Engineering. 5. Oil and Gas Pipeline Transportation Routing and Feasibility. 6. Web enabled GIS Driven Software Development and Database Creation for Infrastructure (Public Health Engineering, Highway, Irrigation, Pipeline, and Electrical) Networks and Assets. Also includes GIS for Topographic, Cadastral, Environmental and Urban Planning. 7. Software development to improve productivity for Engineering Design and Drafting (CAD) fields. 8. Civil and Structural Design. 9. Town Planning and Urban Development. 10. Environmental Engineering and Environmental Impact Assessments and Permitting. 11. Assistance in Right of Use Acquisition and Permitting.	1. Land Surveying for Topographic, Cadastral Mapping, Construction Supervision and Hydrographic Surveys. 2. Photogrammetry, LiDar, Satellite Image Processing and Remote Sensing and generation of 3D Digital Terrain and City models. 3. Water Distribution System Leak Detection, Pressure Monitoring and GIS Based Asset Management Services. 4. Detection of Underground Utilities using Ground Penetrating Radar and Associated Tools. 5. Geotechnical Engineering and Soil Investigations. 6. Ground water and Resistivity Surveys 7. Underwater Leak Detection and Turnkey Solutions. 8. GIS Data Conversion and Maintenance. 9. Route Planning, 3D Corridor Mapping, Generation of GIS database 10. Exploration, Mine Survey & Planning. 11. Terrain Evaluation and Geological Appraisal.

SECON has long-term partnerships with International Engineering and Mapping Firms across Asia, North America, Africa, Middle East, Europe and Australia and has executed both Engineering and Mapping projects in these areas for its clients. SECON is registered with Asian Development Bank (ADB) and DACON (World Bank) to provide consultancy services.

SECON has the following standing in India:

- The largest private (non-government) Land Surveying and Mapping firm in India for Topographic and Cadastral Surveys.
- One of the Largest and most Experienced Firms for Land Acquisition Assistance for Pipeline, Highway and other Linear Corridor and Large Area projects. SECON has developed Customized Web Enabled Software for Data Management and Administration of this Complex Process which have included the compilation and data management more than 10 million parcels compiled by SECON as of date.
- The largest private (non-government) Mapping and Design firm for Irrigation and Water Management projects.
- One of the largest private (non-government) Highway Mapping, Design and Construction Supervision firms in India.
- One of a handful of firms in India to have the NABL certification for its Geotechnical Laboratory. NABL is the National Accreditation Board for Testing and Calibration Laboratories (NABL).

  Government of India has authorized NABL as the sole accreditation body for Testing and Calibration laboratories.
- The first private (non government) company to execute Lidar flying and processing services in India. SECON now the largest Lidar Data processing company in India.

SECON has a state of the art 105,000 sq ft ISO 9001:2008 certified operations center set on a 2.5 acre campus in Bangalore, India that is fully owned by the company. Bangalore is the technology capital of India and is globally recognized for its technical excellence.

SECON is the only agency in India with the experience to perform both the mapping and design of Infrastructure Projects. The mapping and design capabilities have been mentioned in the Profile section at the beginning of this document.

SECON's over 3 decades of mapping experience expertise in Land Surveying, Aerial Photography and Photogrammetry, Lidar Data Acquisition and Processing, and Remote Sensing, gives it an advantage for the accurate mapping since it has a comprehensive combined experience in all technologies.

Annual Photogrammetry, LiDAR, Remote Sensing and GIS capacity is over 250,000 hrs.

2. Photogrammetry Service

SECON and its Partners offer Aerial Photography Services in India.

For International Clients, SECON offers a full range of Digital Photogrammetry processing services.

SECON performs Photogrammetry services from both Aerial Photographs and Stereo Satellite Images for all the latest Aerial and Satellite Photography sensors.

Services offered include:

- Aerial Triangulation for Aerial Photos/Exterior Orientation(EO) for Satellite Imagery
- Topographic/Planimetric Mapping and Updating
- DSM/DTM/ Contour Generation
- Orthophoto generation/ Mosaicing/ Tiling
- 3D City and Feature Modeling
- Close Range Photogrammetry

Please refer to the end of the document for references for a sample of the Photogrammetry Projects executed by SECON.

3. Lidar Service

SECON and its Partners offer Lidar Acquisition Services in India.

For International Clients, SECON offers a full range of Lidar Data processing services.

SECON specializes in the entire spectrum of Lidar Data Compilation with experienced staff, advanced Lidar Data Processing software and workstations.

SECON has the one of largest Lidar Data processing teams in India. SECON was one of the pioneers in starting Lidar Data Processing services in India.

SECON was the First Indian (Private) company to do LiDAR Aerial Data Acquisition in India for Flood Impact Assessment.

From 2008 to as of March 31, 2011, SECON has executed more than 200,000 sq km of Lidar Data processing.

Annual LiDAR editing capacity is over 160,000 sq km (for normal terrain)

The LiDAR Data Service Areas include:

1. Terramatching
2. Orthophoto from small format camera's (like Rollei)
3. Ground-Non Ground classification
4. Ground-Non Ground – building – vegetation classification
5. Power line classification and power line digitization (3D)
6. 3D Surface Model Generation and 3D Mapping of Buildings, vegetation, roads and water bodies for power line analysis
7. Contour Generation
8. Breakline collection from Intensity images
9. LiDARgrammetry
10. Deliverables generation like DEM, ASCII, Raster images etc
11. Customized Lidar Tool Software Development and Automation.

Please refer to the end of the document for references for a sample of the Lidar Projects executed by SECON

4. GIS Service

SECON has been offering GIS services since 1995 and has vast experience in the creation and maintenance of GIS databases and applications for diverse clients.

SECON is one of the oldest users of Autodesk, Bentley and ESRI software in India. SECON was one of the first ESRI Business partners in India and is also a member of the Autodesk Developer Network and the ESRI Developer Network.

GIS Driven Software Development

SECON has vast experience and proficiency in developing applications on ESRI, Bentley Microstation and Autodesk platforms. SECON is also familiar with Geomedia and open source GIS software. SECON has a proficiency in developing applications for Pipelines, Right of Way Management and Water & Sanitation applications. The spectrum ranges from simple desktop applications to Web enabled enterprise GIS application development. Please refer to the experience section at the end of this document for a sample of the relevant experience of SECON in GIS driven application development.

GIS/CAD Data Conversion

SECON has a large team of GIS technicians to provide GIS/CAD data conversion services for a variety of industries such as:

- Water and Sanitation
- Oil & Gas
- Cadastral and Parcel Mapping
- ALTA and Title Mapping
- Water Resources and Floodplain mapping
- Environment and Natural Resources
- Irrigation and Flood Control
- Photo Interpretation and Data Capture
- Electric Utilities
- Telecom

Testimonial

"We are very satisfied with the services rendered by Secon Surveys Pvt Ltd and would strongly recommend them for GIS services and software solutions"

Program Manager, Information Solutions, PBS&J

SECON has executed GIS conversion projects across the globe for clients in the North America, Europe, Africa, Middle East, Australia and India.

5. Security at SECON's ISO 9001:2008 Certified Operations Center

SECON has a state of the art 105000 sqft ISO 9001:2008 certified operations center that is fully owned by the company.

This operations center is a secure facility and has robust security controls.

The controls include:

Security - Physical Controls

- 24X7 security guards
- Access Control Devices to restrict access to the different areas of the Operations Center.

Security - Technical Controls

- Network Monitoring Tools
- Web content filtering tools to restrict websites and ftp sites.
- Anti-Virus Tools
- Firewalls
- Secure Servers
- Encryption
- Restricted and controlled access to floppy drives, zipped drives and CD/DVD writers-these are disabled on all machines. Disabled USB drive data transfer on all machines. Only the network administrator can do data transfer to external devices and closely controls this external data transfer.
- Restricted access and monitoring of SECON FTP site.
- Regular backup of data on daily and weekly intervals
- Power Backup with UPS and Generators
- Leased Line Backup for Internet Connectivity

6. Offices and Contact Information

India	USA
147, 7B Road, EPIP, Whitefield Bangalore 560066 Phone:+ 91-80-41197778 Fax:+ 91-80-41194277 Email: feedback@SECON.in	4281 Express Lane Suite L8929 Sarasota, FL 34238 Phone: +1-727-493-2214 Fax: +1-727-499-6945 Email: feedback@secon.in

7. Sample Project References

The following projects are representative samples of SECON's experience.

7.1. Photogrammetry and LIDAR processing

Assignment Name : LIDAR Cleanup and Breakline collection		**Country :** USA
Location within Country: USA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 20
Address: Under NDA		**No. of Staff Months: 40**
Start Date (Month/Year) April 2010	**Completion Date** (**Month/Year**) August 2010	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Number of tiles:4636 tiles of 5000ftX5000ft size (9,500 sq km)
The project was to filter Laser points to respective classes. Some of the ground points are taken back to default points and some default points are converted back to ground points.
3D drainage system was collected for the entire county that will facilitate flood modeling.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software (terra scan and terra modeler from terrasolid) to check the data quality.

Production: LiDAR cleanup work where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

With the help of LiDAR surface and Intensity images, entire drainage system for the county captured in 3D.

Finalization: QC'd LiDAR breakline data are draped to QC'd LiDAR surface, checked for mismatch and corrected wherever necessary.

Assignment Name : LiDAR Cleanup, Breakline collection and Contour generation		**Country :** USA
Location within Country: USA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 20
Address: Under NDA		**No. of Staff Months: 84**
Start Date (Month/Year) 20th April 2010	**Completion Date** (**Month/Year**) 28th June 2010	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:

Number of tiles:14000 tiles of 5000ftX5000ft size (25,000 sq km)

The project was to filter Laser points to respective classes. Some of the ground points are taken back to default points and some default points are converted back to ground points.

Contours are generated using model key points and photogrammetrically collected Breaklines.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software (terra scan and terra modeler from terrasolid) to check the data quality.

Production: LiDAR cleanup work where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: QC'd photogrammetry breakline data are draped to QC'd LiDAR surface, checked for mismatch and 2 foot contours generated over Terra Modeler surface.

Assignment Name : Narmada Basin Topographic Mapping and Design		**Country :** INDIA
Location within Country: Madhya Pradesh		**Professional Staff Provided by your firm:**
Name of Client : ----------		**No. of Staff** : 10
Address: ----------		**No. of Staff Months** : 23
Start Date (Month/Year) 8 January 2010	**Completion Date** (**Month/Year**) Ongoing	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Total Area: 13000 Sq.Km
Map Scale:1:2500
Contour Interval:1m
The project is to preparation of Planimetric & Topographic map using High Resolutions World View 2(0.5m resolution) Stereo Satellite Imagery for Macro level planning.

This is a landmark project in India and the first of its kind in India. The accuracy achieved was 0.5m Horizontal and Vertical.

This level of accuracy has even impressed the Satellite Image Provider and they propose a partnership with SECON to provide this technology transfer to the Satellite Image Provider's clients

Description of Actual Services Provided by your Staff:

Pre-production: The input data is checked for correctness & completeness.

Production: Carrying out Exterior Orientation(EO) by using DGPS control points for the AOI using Stereo Satellite Imagery. The Planimetric & Topographic map compilation is carried out on 1:10000 scale with 5m contour interval for Macro level planning.

QA: Corrections are carried out sheet wise for proper continuation of data in stereo & the DTM and Planimetry map is finalized sheet wise.

<table>
<tr><td colspan="2">Assignment Name :

Morand and Ganjal complex Project in Narmada Basin</td><td>Country :
INDIA</td></tr>
<tr><td colspan="2">Location within Country:
Madhya Pradesh</td><td rowspan="2">Professional Staff Provided by your firm:

No. of Staff : 10</td></tr>
<tr><td colspan="2">Name of Client :
----------</td></tr>
<tr><td colspan="2">Address:
----------</td><td>No. of Staff Months : 23</td></tr>
<tr><td>Start Date (Month/Year)
7 October 2009</td><td>Completion Date (Month/Year)
8 January 2010</td><td></td></tr>
<tr><td colspan="2">Name of Association Firm(s) if any:</td><td>No. of Months of Professional Staff provided by Associated Firm(s) :</td></tr>
<tr><td colspan="3">Narrative Description of Project:
Total Area: 2947 Sq.Km
Map Scale:1:10000
Contour Interval:5m
The project is to preparation of Planimetric & Topographic map using Cartosat-1(2.5m) Stereo Satellite Imagery for Macro level planning.</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by your Staff:

Pre-production: The input data is checked for correctness & completeness.

Production: Carrying out Exterior Orientation(EO) by using DGPS control points for the AOI using Stereo Satellite Imagery. The Planimetric & Topographic map compilation is carried out on 1:10000 scale with 5m contour interval for Macro level planning.

QA: Corrections are carried out sheet wise for proper continuation of data in stereo & the DTM and Planimetry map is finalized sheet wise.</td></tr>
</table>

Assignment Name : BCE (Bangalore Chennai Expressway)		**Country :** INDIA
Location within Country: Karnataka, Andhra Pradesh & Tamilnadu		**Professional Staff Provided by your firm:**
Name of Client : ----------		**No. of Staff** : 18
Address:----------		**No. of Staff Months** : 9
Start Date (Month/Year) 1 October 2009	**Completion Date** (**Month/Year**) 31 December 2009	
Name of Association Firm(s) if any: --		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Total Area: 700 Sq.Km
Map Scale:1:5000
Contour Interval:2m

The project is to Preparation of Planimetric & Topographic Map from Stereo Satellite Images for 350km x 2km corridor width to produce 2m contours. Generation of Digital Terrain Model (DTM) for identifying & finalizing the alignment of the Expressway.

This project was the first of its kind for the National Highway Authority of India (NHAI), where the expressway alignments were primarily identified using 3D Satellite Imagery and Major field work was avoided.

Description of Actual Services Provided by your Staff:

Pre-production: The input data is checked for correctness & completeness.

Production: Exterior Orientation(EO) is carried out by using SOI Topo sheet GCP's for the AOI using Cartosat-1(2.5m) Stereo satellite imagery. The Stereo satellite model is used to prepare Planimetric & Topographic Map. Using the Topographic information 2m contours are generated & edited for correctness & completeness. Finally DTM is generated and used for alignment finalization.

QA: Corrections are carried out sheet wise for proper continuation of data in stereo & the topographic & planimetric data is finalized sheet wise.

Assignment Name : Lagos LiDAR editing		**Country :** **Nigeria**
Location within Country: Lagos state of Nigeria		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 30
Address: Under NDA		**No. of Staff Months: 8**
Start Date (Month/Year) August 2009	**Completion Date** (**Month/Year**) Sept 2009	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Number of tiles:2670 tiles of 1000mX1000m size (2670 sq km)
The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are opened in LiDAR software (terra scan and terra modeler from terrasolid) to check the data quality.

Production: LiDAR cleanup work where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: QC'd photogrammetry breakline data are draped to QC'd LiDAR surface, checked for mismatch

Assignment Name : USA County LiDAR editing and Contour generation		**Country :** USA
Location within Country: Minnesota		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 30
Address: Under NDA		**No. of Staff Months: 75**
Start Date (Month/Year) January 2009	**Completion Date** (**Month/Year**) July 2009	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Number of tiles:3300 tiles covering more than 12,400 sq km
The project is to filter Laser points to respective classes. Capture linear features and use it for contour generation.

Contours are generated using model key points and collected Breaklines. All the deliverables such as raster DEM, LAS and Contours are put into GIS Data base

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software (terra scan and terra modeler from terrasolid) to check the data quality.

Production: LiDAR cleanup work where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: QC'd photogrammetry breakline data are draped to QC'd LiDAR surface, checked for mismatch and 2 foot contours generated over Terra Modeler surface.

Finalized data has been put together in a GIS Software to create a data base for DEM, drainage system, Contours and ground data

<table>
<tr><td colspan="2">Assignment Name :

02-301(Alaska DEM)</td><td>Country :
CANADA</td></tr>
<tr><td colspan="2">Location within Country:
Alaska USA</td><td rowspan="2">Professional Staff Provided by your firm:

No. of Staff : 18</td></tr>
<tr><td colspan="2">Name of Client :
Under NDA</td></tr>
<tr><td colspan="2">Address:
Under NDA</td><td>No. of Staff Months : 24</td></tr>
<tr><td>Start Date (Month/Year)
30 March 2009</td><td>Completion Date (Month/Year)
15 May 2009</td><td></td></tr>
<tr><td colspan="2">Name of Association Firm(s) if any:</td><td>No. of Months of Professional Staff provided by Associated Firm(s) :</td></tr>
<tr><td colspan="3">Narrative Description of Project:
Total Area: 476 square miles
Photo Scale:1:24000
Map Scale:1:5000
Contour Interval:2m
The project is to compilation of break lines & mass points for 800m corridor width to produce 2m contours & DEM generation.</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by your Staff:

Pre-production: The input data is checked for correctness & completeness.

Production: Using the Aerial Triangulation results & the LiDAR points as input, break lines are digitized & the LiDAR points are edited to ground to produce the DEM.

QA: Corrections are carried out tile wise for proper continuation of data in stereo & the DEM is finalized tile wise.</td></tr>
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Assignment Name : London DTM and DSM		**Country :** England, UK
Location within Country: London		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 14
Address: Under NDA		**No. of Staff Months: 3.5**
Start Date (Month/Year) Nov 2008	**Completion Date** (**Month/Year**) Jan 2009	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Number of tiles: 2160 tiles of 500m X 500m (500 sq km)
Project requires editing of ALS data to produce Digital Surface Model and Digital Terrain Model model.

Description of Actual Services Provided by your Staff:

Pre-production: Checking provided data for completeness. Creating macro for initial classifiaction.

Production: DTM and DSM sufaces were generated from macro processed ALS data and checked/fixed the anomalies.

QA: Made correction on any anomalies remained during production on both DSM and DTM surfaces.

Finalization: Edgematched between tiles and delivered.

Assignment Name : Urban LiDAR Capturing Program, Australia		**Country :** Australia
Location within Country: Major Cities of Australia		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 10
Address: Under NDA		**No. of Staff Months: 67**
Start Date (Month/Year) Aug 2008	**Completion Date (Month/Year)** Dec 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Number of tiles: 2850 tiles of 1000m X 4000m each (11,000 sq km)
The project is to produce bare earth as well as building definition. Processing macro to classify initial ground and buildings and manual editing to gain 85% accuracy.

Description of Actual Services Provided by your Staff:

Pre-production: Data check for density, quality and coverage. Creating tiles and project definition using timestamped trajectories. Executing general macro developed by SECON.

Production: LIDAR filteration for bare earth as well as classifying building with 85% accuracy.

QA: Cross section check throughout the tile to check for accuracy and completeness.

Finalization: Edge match check with adjacent tiles.

Assignment Name : PH-2008-411-PCS Aerial Triangulation		**Country :** UAE
Location within Country:		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 5
Address: Under NDA		**No. of Staff Months** : 2
Start Date (Month/Year) 06 August 2008	**Completion Date** (**Month/Year**) 09 September 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Total Area: 1396 square miles(2186 Images)
Photo Scale:1:12000
The project is to densify control points by means of Aerial Triangulation.

Description of Actual Services Provided by your Staff:

Pre-production: The input data is checked for correctness & completeness.

Production: Aerial Triangulation is carried out by setting up the different sub blocks. By solving each sub block, the entire project is merged into one single block & processed for all the given images.

QA: The inspection of rms values & graphical analysis of results along with stereo checks is carried out to finalize the results.

Assignment Name : Canadian County LiDAR data cleanup		**Country :** Canada
Location within Country: Canadian County, Canada		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 20
Address: Under NDA		**No. of Staff Months: 7.5**
Start Date (Month/Year) March 2008	**Completion Date** (**Month/Year**) June 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:

Number of tiles: 550 tiles of 4.8 km sq each (2640 sq km)
The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points. Height problem caused because of different flight lines are corrected. Low points, Vegetation points and error points also classified. Finally a macro is processed to classify unwanted points to error points.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software (terra scan and terra modeler from terrasolid) to check the data quality .

Production: LiDAR cleanup work where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: Final Macro process applied to remove unnecessary points.

Assignment Name : Photogrammetry Compilation, merging of Photogrammetry features, mass points to LiDAR surface and contour generation		**Country :** USA
Location within Country: PA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 25
Address: Under NDA		**No. of Staff Months** : 45
Start Date (Month/Year) 19 September 2007	**Completion Date** (**Month/Year**) 17 April 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Name of Senior Staff (Project Director / Coordinator, Team Leader) involved and functions performed

Mr. Dhyan Appachu	Client coordination, Business deals
Mr. Col. Shanbhag	Project Management, Client Management, Submissions, Timelines, Quality Control

Narrative Description of Project:

Total Area: 212 square miles
Photo Scale:1:8000
Map Scale:1:1200
Contour Interval:2'
The project is to compile features in Photogrammetry, filter Laser points to respective classification, thinout the points to support 2 foot contours (pick a point in every 30 foot distance). LiDAR thinned points are inserted to photogrammetrically captured DTM and 2 foot Contours are generated.

Description of Actual Services Provided by your Staff:

Pre-production: The input data is checked for correctness & completeness.

Production: Planimetric & Topographic features compilation to produce 2' contours.

DTM and Plannimmetry features are captured in photogrammetry, QC'd DTM is merged with LiDAR surface. 2 foot contours generated in Terra Modeler. A GDB consisting of Plannimetry and contours are created in ARCGIS.

QA: All feature types are QC'd for layerization, flow and continuity in ARCGIS

Assignment Name : Planimetric & topographic map updating & 2' contours generation.		**Country :** USA
Location within Country: PA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 7
Address: Under NDA		**No. of Staff Months** : 14
Start Date (Month/Year) 06 August 2007	**Completion Date** (**Month/Year**) 16 March 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
Total Area: 270 square miles
Photo Scale:1:10000
Map Scale:1:1200
Contour Interval:2’
The project is to update planimetric & topographic features in Photogrammetry, to support 2 foot contours.

Description of Actual Services Provided by your Staff:

Pre-production: The input data is checked for correctness & completeness.

Production: Client given data is photogrammetrically updated by using the latest imagery tile wise. The DTM data is then used to generate 2' contours.

QA: All feature types are QC'd for layerization, flow and continuity & completeness.

Assignment Name : County USA LIDAR data cleanup and Contour Generation		**Country :** USA
Location within Country: PA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 10
Address:		**No. of Staff Months** : 15
Start Date (Month/Year) 15th May 2006	**Completion Date** (**Month/Year**) 28th July 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points.
Contours are generated using model key points and photogrammetrically collected Breaklines.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software to check the data quality and corrupt files.

Production: LiDAR clean up work using TerraScan where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: Final checking in TerraScan/Terra Modeler with generated contours and surface.

Assignment Name : US County Orthophoto production		**Country :** USA
Location within Country: Georgia		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 5
		No. of Staff Months : 10
Start Date (Month/Year) 2nd May 2007	**Completion Date** (**Month/Year**) 28th June 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :
Narrative Description of Project: The project is to prepare a digital ortho mosaice for entire county containing 1300 frames.		
Description of Actual Services Provided by your Staff: *Pre-production*: Frames are oriented with EO data and checked with control points. *Production*: All aerial images are orthorectified with LiDAR DEM. Seam lines are drawn for all the overlapping portion of the aerial images. Finally all orthorectified images are mosaiced, color balanced and tiled *QA*: All the mosaiced tiles are checked in Photoshop and distorted features are adjusted. *Finalization*: Entire digital ortho mosaiced tiles are opened and checked.		

Assignment Name : USA City Planimetric Mapping		**Country :** USA
Location within Country: Arizona		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 10
Address: Under NDA		**No. of Staff Months** : 10
Start Date (Month/Year) 12th Mar 2007	**Completion Date** (**Month/Year**) 28th Apr 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
The project is to prepare a planimetric map from UltraCam images. Total area of the project is 36 square miles.

Description of Actual Services Provided by your Staff:

Pre-production: Stero models are oriented with EO data and checked with control points.

Production: All planimetric features are captured in digital photogrammetric workstations

QA: Undershoot, overshoot and dangles were checked using QC routines.

Finalization: Photogrammetric product is verified with available ortho mosaic tiles.

Assignment Name : Flood Mapping LIDAR data cleanup and Contour Generation		**Country :** USA
Location within Country: PA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 10
Address:		**No. of Staff Months** : 25
Start Date (Month/Year) 15th Dec 2006	**Completion Date** (**Month/Year**) 28th Mar 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:
The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points.
Contours are generated using model key points and photogrammetrically collected Breaklines.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software to check the data quality and corrupt files.

Production: LiDAR clean up work using TerraScan where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: Final checking in TerraScan/Terra Modeler with generated contours and surface.

Project : USA County LiDAR data cleanup		**Country :** USA
Location within Country: PA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 10
Address: Under NDA		**No. of Staff Months** : 5.5
Start Date (Month/Year) 16th Dec 2005	**Completion Date** (**Month/Year**) 13th Jan 2006	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:
The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points.

Description of Actual Services Provided by SECON **Staff**:

Pre-production: All tiles are open in LiDAR software to check the data quality and corrupt files.

Production: LiDAR clean up work using TerraScan Software where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both direction (vertical and horizontal)

Finalization: Final checking in TerraScan/Terra Modeler Software with generated contours and surface.

Project : USA City DTM collection		**Country :** USA
Location within Country: California		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 12
Address: Under NDA		**No. of Staff Months** : 6
Start Date (Month/Year) 14th Dec 2005	**Completion Date** (**Month/Year**) 6th Jan 2006	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:
The project is of collecting DTM (breaklines and mass points) to create 2' accurate contours.

Description of Actual Services Provided by SECON **Staff**:

As per clients request and sample file, priority was given to collect more breaklines in undulating areas. Almost all models contain golf courses and undulating hills/ lands and hence more time has spent to capture breaklines.

Pre-production: Convert the image file to standard image format. Orient the images according to exterior orientation parameter (georeferencing)

Production: 3D compilations in stereo plotters where 3D breaklines are mass points are collected. All files are edge-matched at the edges.

QA: Check for floating and digging of breaklines and mass points in stereo mode. Check for edge matching with adjacent tiles. Check with QC routines for crossing of breaklines.

Finalization: Final checking in stereo plotter with generated contours.

7.2. Software Development

Project:

SECON Alignment Sheet Generator (SASG)

With the development of the Alignment Sheet Generator, SECON has achieved a fully automated technique to generate Alignment, Cross section details, Engineering Details & Reports for the entire length of a Cross Country Pipeline pipeline.

SASG is a high-end engineering application, which can process the survey data with details like Planimetry, profile, cross-sections, soil investigation / soil resistivity, etc. SASG was developed in-house by SECON and can be customized to meet a client's requirements for generating pipeline alignment sheets.

SASG is also used by a leading European engineering firm for their Water Pipeline Projects in Saudi Arabia. This will help the company generate survey and engineering alignment sheets for their water transmission pipeline projects.

Testimonial

"SECON's Pipeline management modules for generating crossing drawings, bore logs, reports, etc., ensures mapping and capturing with much higher speed and excellent repeatability compared to conventional methods. Updating and retrieval of data and information is greatly simplified. Being GIS compatible, the product has the capability for a seamless integration with other available pipeline application to perform "End-to-End" functions for Pipeline facility in all phase of its life cycle, viz., Concept to Commissioning, ***Asset Management and Statutory Compliances.*** *The modules are field proven"*

Senior Officer, Gas Transportation Infrastructure & Co. Ltd (Reliance Group)., Mumbai, India

SASG has been customized for Reliance (http://www.ril.com/), the largest private sector Indian corporation, and is extensively used by them for their large oil and gas transmission pipeline network.

SASG has the following features:

- Effective Survey Data Management
- Generates Ready to plot Alignment Sheets & Cross Sections
- Cross Sections with Geotech Details & Jurisdiction Details
- Various Reports on Population Density Index, visual Classification of Bore Holes & Soil Strata and Soil Resistivity
- Reports on TP/IP Bearing Angle/ Deflection Angle with List of Coordinates and Progressive Chainage.
- SECON-ASG is currently completely capable to handle alignment sheet generation for the survey portion of any Cross Country Pipeline(Oil/Gas/Water). It is also completely capable to draft the engineering components of a Cross Country Water Pipeline. SASG plots seamless alignment sheets with the Engineers design parameters and calculates the Bill of Quantities(currently for Cross Country Water Pipeline only).

Project:

Irrigation Resource Information System (IRIS)

The Uttar Pradesh Water Sector Restructuring project is aimed to promote more sustainable development and use of the state's limited water resources. As part of this contract, SECON developed IRIS.

The application allows staff to upload, assess, and extract their data on demand and in a geographic context. Among other features, a cartographic interface allows users to query and view geographic details of catchments area in an irrigation network. The tailor made geo-database is used to monitor water resource data.

Testimonial

"We are very satisfied with the services rendered by Secon Surveys Pvt Ltd and would strongly recommend them for GIS services and software solutions"

MIS Expert, PACT,
UP Water Sector Restructuring Project,
Irrigation Dept, UP, India

IRIS helps water resource agencies lower operational costs while improving the effectiveness of their monitoring programs and the quality of services. IRIS can be further customizable to cater to any client's requirement. The system is developed using ArcObjects.

Assignment Name : Route Management System (GEO-RMS)		**Country :** India
Location within Country: Bangalore, India		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 5
Address: Under NDA		**No. of Staff Months:** 15
Start Date (Month/Year) April 2010	**Completion Date** (**Month/Year**) Aug 2010	**No. of Months of Professional Staff provided by Associated Firm(s)** : Not Applicable
Name of Association Firm(s) if any:		

Narrative Description of Project:

GEO-RMS is web based GIS application for route mapping and identifying the all weather motor able shortest route for POL transportation between the depot and end point/retail outlet, asset mapping for the clients distribution network entities to optimize resources, for entire Karnataka.

The functionalities of Geo RMS are

- Map Viewer
- Shortest Route Calculations
- Round Trip Distance Calculations
- Consolidated route sketch for all customers from a supply location
- Consolidated route sketch of all customers from each of the Nine supply locations
- Dynamic Labeling
- Dynamic Changing of Color Symbology
- Dynamic Scaling
- Editing
- Plotting and Printing of graphical areas
- Query Builder
- District-wise ROs/Consumers and Supply-point wise ROs/Consumers
- Get the X-Y co-ordinates of any location on the Map
- GPS point recording directly to the map
- Measurement/length tool

Description of Actual Services Provided by your Staff:

- Requirements Analysis
- Survey and Mapping of Road Network
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training

Assignment Name : Pipeline Asset Management System [PAMS]		**Country :** India
Location within Country: Gujarat, India		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 10
Address: Under NDA		**No. of Staff Months: 120**
Start Date (Month/Year) Feb 2007	**Completion Date** (**Month/Year**) Dec 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:

This web-based GIS solution is designed to cater for the management of assets throughout the lifecycle of a pipeline. It provides complete management and upkeep of Pre-engineering, Engineering, Health-Safety-Environment measures, Risk Assessment, Emergency Response Planning, Operation & Maintenance, Document Management System and spatial representation of data through GIS Based Map Viewer

Description of Actual Services Provided by your Staff:

- Requirements Analysis
- Data Collation and Mapping
- Geo-database Preparation
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training
- Application Maintenance

Assignment Name : City Gas GIS for 2 cities and 11 CGD of Gujarat State		**Country :** India
Location within Country: Gujarat, India		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 5
Address: Under NDA		**No. of Staff Months: 67**
Start Date (Month/Year) Aug 2008	**Completion Date** (**Month/Year**) Jul 2010	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:

A web based system to manage City Gas distribution Network. It is a GIS based handling of city gas network in web by maintaining up-to-date information in centralized enterprise database with support to Analysis, Engineering, O&M, Planning, etc. activities. Valuable decision support system for planning & emergency response and an effective marketing tool for gas distribution companies.

City GAS GIS solution offers:

Easy retrieval of information related to
- Detailed map features, Roads & existing utility networks, As-Built details
- Existing & Potential Consumers
- Emergency assisting centers/locations/information's

Links to
- Billing information & Consumer information

Customized Query & report generation for
- Gas usage statistics and Maintenance statistics, etc.

Description of Actual Services Provided by your Staff:

- Requirements Analysis
- Data Collation and Mapping
- Site Verification and Validation
- Geo-database Preparation
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training
- Application Maintenance

Assignment Name : City Gas GIS For 2 Cities of Gujarat State		**Country :** India
Location within Country: Gujarat, India		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 6
Address: Under NDA		**No. of Staff Months: 67**
Start Date (Month/Year) Oct 2007	**Completion Date** (**Month/Year**) May 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:

A web based system to manage City Gas distribution Network. It is a GIS based handling of city gas network in web by maintaining up-to-date information in centralized enterprise database with support to Analysis, Engineering, O&M, Planning, etc. activities. Valuable decision support system for planning & emergency response and an effective marketing tool for gas distribution companies.

City GAS GIS solution offers:

Easy retrieval of information related to
- Detailed map features, Roads & existing utility networks, As-Built details
- Existing & Potential Consumers
- Emergency assisting centers/locations/information's

Links to
- Billing information & Consumer information

Customized Query & report generation for
- Gas usage statistics and Maintenance statistics, etc.

Description of Actual Services Provided by your Staff:

- Requirements Analysis
- Data Collation and Mapping
- Site Verification and Validation
- Geo-database Preparation
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training
- Application Maintenance

Assignment Name : City Gas GIS For 10 Cities of Gujarat State		**Country :** India
Location within Country: Gujarat, India		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** 6
Address: Under NDA		**No. of Staff Months: 48**
Start Date (Month/Year) Oct 2007	**Completion Date (Month/Year)** May 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Narrative Description of Project:

A web based system to manage City Gas distribution Network. It is a GIS based handling of city gas network in web by maintaining up-to-date information in centralized enterprise database with support to Analysis, Engineering, O&M, Planning, etc. activities. Valuable decision support system for planning & emergency response and an effective marketing tool for gas distribution companies.

City GAS GIS solution offers:

Easy retrieval of information related to
- Detailed map features, Roads & existing utility networks, As-Built details
- Existing & Potential Consumers
- Emergency assisting centers/locations/information's

Links to
- Billing information & Consumer information

Customized Query & report generation for
- Gas usage statistics and Maintenance statistics, etc.

Description of Actual Services Provided by your Staff:

- Requirements Analysis
- Data Collation and Mapping
- Site Verification and Validation
- Geo-database Preparation
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training
- Application Maintenance

Project: ROU Master – Right of Way Management Software		**Country:** India
Location within Country: Gujarat		**Professional Staff Provided by your firm:**
Name of Client: Under NDA		**No. of Staff** : 10
Address: ----------		**No. of Staff Months** : 125
Start Date (Month/Year) January 2003	**Completion Date** (**Month/Year**) February 2005	
Name of Association Firm(s) if any: NIL		**No. of Months of Professional Staff provided by Associated Firm(s)** : Not Applicable

Narrative Description of Project:

ROU Master a Right of Use (RoU) Acquisition software is an advanced windows based software that provides details about land records, ownership details and automates the complete land acquisition process.

It is useful for managing enormous data collected & generated for various activities involved with ROU Acquisition. The laborious work of generating reports and notices for individuals is replaced by a few keystrokes on the computer.

Data Migration: The data for 16 pipeline projects spanning 700 kilometers was automated using ROU Master.

Description of Actual Services Provided by SECON Staff:

- Requirements Analysis
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training
- Data Migration

Project: ROU Master – Right of Way Management Software		**Country:** India
Location within Country: Karnataka,Maharastra,Gujarat,Goa,Punjab, Andra Pradesh,Tamil Nadu,Madhya Pradesh,Rajasthan ,West Bengal and Orissa		**Professional Staff Provided by your firm:**
Name of Client: Under NDA		**No. of Staff** : 8
Address: ----------		**No. of Staff Months** : 95
Start Date (Month/Year) October 2003	**Completion Date** (**Month/Year**) December 2004	
Name of Association Firm(s) if any: NIL		**No. of Months of Professional Staff provided by Associated Firm(s)** : Not Applicable

Narrative Description of Project:

ROU Master a Right of Use (RoU) Acquisition software is an advanced windows based software that provides details about land records, ownership details and automates the complete land acquisition process.

It is useful for managing enormous data collected & generated for various activities involved with ROU Acquisition. The laborious work of generating reports and notices for individuals is replaced by a few keystrokes on the computer.

Remote Upload: The data updated at all the sites offices is uploaded to the central server using “Remote Upload”, a special tool of ROU Master. The data is transferred through secured FTP.

Description of Actual Services Provided by SECON Staff:

- Requirements Analysis
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training

Project: Web-enabled Watershed Monitoring and Management System (GIS)		**Country :** Canada
Location within Country: Toronto		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 3
Address: ----------		**No. of Staff Months** : 30
Start Date (Month/Year) June 2003	**Completion Date** (**Month/Year**) January 2004	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:

This consolidated GIS system, Watershed Monitoring and Management System provides a web-based data uploading, mapping, assessment, and reporting service for various indicators like Fish, Benthol & Water Chemistry of watershed health.

Description of Actual Services Provided by SECON Staff:

This pilot project focuses on the development of a Web-based data assessment and reporting system to support the TRCA's Regional Watershed Monitoring Program. As a pilot project, its purpose is to demonstrate how biological monitoring and abiotic data can be presented in a geographic context to facilitate the sharing of watershed monitoring data with civic, scientific and political stakeholders.

This consolidated system will provide for a web-based data uploading, mapping, assessment, and reporting service for various water quality indicators.

A three-tier architecture infrastructure was implemented in a Windows 2000 environment to allow map services to be served through an ArcIMS server and presented through a customized thin HTML interface.

All data will be contained in Geodatabases and managed by ArcSDE. Additional services and functionality (e.g., data entry, catalogues indexing and dynamic web reporting) is provided through custom MapObject programming, Java 2 Enterprise Edition (J2EE) and integration with other supporting applications (e.g., Crystal Decisions)

Project : Pipeline Database Management System - Development of Comprehensive, software for generation of GIS/MIS database for survey and ROU/TOW data, engineering applications, to facilitate Disaster Management Module, Pre construction, Construction, Post construction, Operation Maintenance		**Country :** India
Location within Country: Gujarat		**Key professional staff Provided by your Firm/entity (profiles):**
Name of Client : Under NDA		**No. of Staff** : 10
Address: ----------		**No. of Staff Months** : 90 **Duration of assignment** : 9 months
Start Date (Month/Year) February 2003	**Completion Date** (**Month/Year**) November 2003	
Name of Association Firm(s) if any: Nil		**No. of Months of Key professional staff, provided by Associated Consultants** : Not Applicable

Narrative Description of Project:
Integrating pre construction, post construction and O&M details into database with user-friendly GIS tools developed for easy retrieval of data, reports generation and presentation

Description of Actual Services Provided by SECON Staff:

- Carrying out user assessment study
- Procurement of Satellite imagery and preparation of base map
- Georeferencing of the seamless map based on established ground control points
- Convert all engineering details like alignment sheets, pipe books, P&ID drawings, As-built drawings, Geotech details into computer format
- Integration of Cadastral survey details & Acquisition details
- Carrying out Ground survey for as-built updating – Deployment of GPS interfaced with Pocket PC in order to collect the ground truth data and the pipeline details involving bends, SV, CP, CV, Main line Valve stations, etc.,
- Collecting Disaster management support details like Hospitals, Fire extinguishers, Police stations, etc and integrating in GIS Map
- Converting all maps & large scale survey details to GIS format & Creation of GIS database
- Development of exclusive software for GIS/LIS including Training and Implementation. Application modules for Disaster Management support, Land/survey details, Document management system, WEB based O&M and Crossing details access are provided

7.3. Topographic and Cadastral Land Surveying and Mapping

Project : Topographic and Cadastral Survey & Preparation of Land Records (World Bank aided)		**Country:** India
Location within Country: Uttar Pradesh, India		**Professional Staff Provided by your firm:**
Name of Client: Under NDA		**No. of Staff** : 125
Address: ----------		**No. of Staff Months** : 2750
Start Date (Month/Year) January 2004	**Completion Date** (**Month/Year**) Jan 2006	**Number of Parcels**: Project scope covered app. 1,521,352 acres(2377 sq miles, 615658 Hectares) – 2,500,000 parcels app.
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:

Topographic and Cadastral survey and preparation of Land records and establishment of a survey grade GIS database. The project area covered 1,521,352 acres (2377 sq miles) – 2,500,000 parcels app. The outputs of the assignments are used for redesigning and rehabilitation of all the Irrigation and Drainage systems. Various analysis such as flow analysis and spatial analysis are performed using the GIS coverage's that is created as the output. This is the largest topographic and cadastral mapping project done in India by a private (non government) agency.

Description of Actual Services Provided by SECON **Staff**:

Topographic mapping 1,521,352 acres (615658 Hectares/2377 sq miles) with 20cm contour interval at 1:5000 scale.
Cadastral mapping of approximately 2,500,000 parcels -field data collection, Field surveys for control, conversion from hardcopy to GIS format
Generation of survey grade GIS database with combined topographical and cadastral details.
GIS software development of customized application for the GIS database—generates custom views, reports, queries.
GIS training for the irrigation staff

Project: Gujarat State Industrial Landuse Base Map Generation, Gujarat, India		
Client Name: Under NDA		
Project Performance Period	**From:** January 2000	**To:** January 2005
Location of Project: Gujarat, India		

Brief Description of the services for this project:
Mapping of 1581 km long Gas Pipelines in Gujarat and preparation of GIS based Industrial Database for 2,35,000sq km

Services provided :

- Generation of maps from Satellite Imagery and SOI Topo Maps(1:50000 scale)
- Creation of GIS database for the pipeline corridor
- Centre line survey, detailed engineering survey, soil investigation and soil resistivity survey, cadastral and ROU acquisition as per P&MP Act.
- Study of alternatives and finalisation of optimum corridor.
- Establishment of trench centre line, profile survey
- Survey of Pipeline corridor using GPS and high end Total Stations
- Soil investigation and soil resistivity survey at 500 m intervals
- Collection of Population Density and Social data
- Hydrological and geotechnical investigations for River crossings
- Cadastral survey and preparation of land plan schedule
- Preparation and serving of notices under Section 3(i) and 6(i) of P&MP Act, 1962 and publication of the same in the Gazette of India
- Generation of data for Environment Impact Assessment and Environmental Clearance from the Ministry of Environment and Forests.
- Obtaining clearances for various crossings, such as Expressways, National Highway, State Highways, Railways, Utilities, etc.
- Generation of Gujarat Map Database from Satellite Imagery using latest practices.
- Development of exclusive software for GIS/LIS and ROU acquisition including Training and Implementation

7.4. Data Conversion

Assignment Name : Epic of fuel gas supply to QNCC-IV and GCC-I plants at Umm Bab Areas GIS		**Country :** Qatar
Location within Country: Umm-Bab		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 3
Address: Under NDA		**No. of Staff Months** : 3.5
Start Date (Month/Year) February 2010	**Completion Date (Month/Year)** April 2010	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:

Conversion of Pipeline & its associated objects (Pipeline, Culvert, Intersection point, Intersection line, Road crossing point etc.), Stations & its associated objects (Station Pipe, Buildings, Valves, Pig launcher/ Receiver etc.), Electrical System(Underground cable, Circuit breaker, Fuse, Earth pit,
Bus bar etc.) and Instrument System (Instrument cable, Junction box etc.) with the use of given inputs Alignment sheets, GA drawings, Crossing list, P&ID drawings, Isometric drawings, Instrument and Electrical layout drawings etc. as a 3d/2d eleme and link it with its attribute detail stored in external Microsoft access database.

Description of Actual Services Provided by your Staff:

Scrubbing: Scrub the as-built hardcopy with necessary color code for required details and pass it to the production team.

Production: Capture Pipeline & its associated objects, Station & its associated objects, Electrical and Instrument details as a 3d/2d element using given inputs. Also attach attribute to these captured features from its respective as-built sheets, datasheets and design memorandum.

QA/QC: Check for missing / Incorrect feature and its attributes. Also check for Dangling, duplicate features and Continuous network of pipeline/station features. Export attribute data to external database provided by the Client and create a link to between AutoCAD entities to records of external database (Microsoft database) using a unique id.

Assignment Name : Waste Water/Water GIS Conversion and Map book Creation		**Country :** USA
Location within Country: County of San Diego		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 9
Address: Under NDA		**No. of Staff Months** : 34
Start Date (Month/Year) December 2008	**Completion Date** (**Month/Year**) November 2009	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:
The projects is to geo-reference the scanned 3500 as-built drawing to the County of San Diego (Alpine, Lakeside, Julian, Pine Valley, Spring Valley, Campo, Winter Garden districts) parcel base and digitize the water & sewer features to create an ESRI geo-database.

Also Create Mapbook at scale of 1:3000

Description of Actual Services Provided by your Staff:

Scrubbing: Scrub the as-built hardcopy with necessary color code for required details and pass it to the production team.

Pre-production: Convert the Base data Shape File (Source File) to the AutoCAD drawing Format which consisting of Parcels and Road Centerlines. Geo-reference the image (.Tiff) in the drawing referring the street name specified in the Road Centerline shape file.

Production: Digitize or Draft the Water & Sewer features except hidden or dashed (i.e. existing) features in the as-built image. Attach attribute to these features, such as Drawing name, Image name, Upstream elevation, Downstream elevation, Material, Install date, Diameter referring the information provided in as-built sheets.

QA: Check for the Geo-referencing of the image to the corresponding street name and Parcel number and other surrounding details. Checking the missing entities & attributes, Dangling, duplicate features and also check for Continuous network of sewer and water features.

Finalization: Edge matching of Sewer and Water features to make the seamless network Creation of Geo-database of Water & Sewer networks using the shape file.

Map book: Create map book at 1:3000 scale with given legend by client.

Assignment Name : Epic of consolidated gas supply projects at Ras Laffan & Mesaieed areas GIS requirements		**Country :** Qatar
Location within Country: Ras-Laffan and Mesaieed		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 3
Address: Under NDA		**No. of Staff Months** : 4
Start Date (Month/Year) August 2009	**Completion Date (Month/Year)** October 2009	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:

Conversion of Pipeline & its associated objects (Pipeline, Culvert, CP Test Post, CP Bond box, FO Cable etc.) and Stations & associated objects (Station Pipe, Buildings, Valves, Pig launcher/ Receiver etc.) with the use of given inputs Alignment sheet GA drawings, Crossing list, P&ID drawings, Isometric drawings etc. as a 3d/2d element and link it with its attribute details stored in external Microsoft access database.

Description of Actual Services Provided by your Staff:

Scrubbing: Scrub the as-built hardcopy with necessary color code for required details and pass it to the production team.

Production: Capture Pipeline & its associated objects and Station & its associated objects as a 3d/2d element using given inputs. Also attach attribute to these captured features, such as Installed date, Diameter, length, pipe class, station name etc. referring the information provided in the as-built sheets, datasheets and design memorandum.

QA/QC: Check for missing / Incorrect feature and its attributes. Also check for Dangling, duplicate features and Continuous network of pipeline/station features. Export attribute data to external database provided by the Client and create a link to between AutoCAD entities to records of external database (Microsoft database) using a unique id.

Assignment Name : Geotechnical Atlas & Plan and Profile Data Scraping Exercise		**Country :** Canada
Location within Country: British Columbia and Yukon		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 10
Address: Under NDA		**No. of Staff Months** : 43
Start Date (Month/Year) November 2008	**Completion Date** (**Month/Year**) March 2009	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:

Four Series of Alignment Sheets to be scraped for the TransCanada Alaska Pipeline Project that includes B.C. Plan & Profile, B.C. Geotechnical Atlas, Yukon Plan & Profile and Yukon Geotechnical Atlas.

Each of these series of Alignment Sheets has unique data bands that need to be captured under the data scraping initiative and many of the bands are interrelated / interdependent.

Description of Actual Services Provided by your Staff:

Geo-referencing: geo-reference the received 450 as-built alignment sheet (Yukon and British Columbia Province) to the given UTM grid.

Production: Digitize or Draft the TransCanada Alaska Gas Pipeline length of 1060 miles with its surrounding details (Contour, Mile post, Terrain polygon and water bodies etc.) and cross section details (Terrain type & group, soil description, geophysics site etc.) found in the band projected over the Pipeline centerline. Also these features are attributed with necessary details as required by the client and found on as-built alignment sheets.

QA: Check for the Geo-referencing of the image to the corresponding UTM Zone, grids and surrounding details. Also Check for the missing entities & attributes, Dangling, duplicate features and data consistency.

Finalization: Data validation, checking captured data with in-house developed scripts/ Macros.

Assignment Name : Orange County Utilities Georeferencing and Create Project Polygon Boundary		**Country :** USA
Location within Country: Florida		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 30
Address: Under NDA		**No. of Staff Months** : 64
Start Date (Month/Year) October 2007	**Completion Date** (**Month/Year**) January 2008	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:
The projects is to geo-reference the scanned 50,000 as-built record drawing to the Orange County Basedata (Parcels and Street Centerline) and Create 10,000 Project Polygon Boundaries for the entire Orange County, Florida.

Description of Actual Services Provided by your Staff:

Georeferenced Water and Waste Water As-Built sheet to the given basedata (Parcel, Street Centerlines). Incase not able to find enough Ground Control Point on the base data then 6" inch resolution aerial photography used as source for georeferencing.

Subdivision, Commercial and Capital Improvement Project Polygon boundaries created for the 10,000 projects

Assignment Name : Valley Center Municipal Water District		**Country :** USA
Location within Country: California		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 12
		No. of Staff Months : 38
Start Date (Month/Year) August 2006	**Completion Date** (**Month/Year**) March 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:
The project is to geo-reference the scanned 4000 as-built drawings to the City of Valley Center parcel base and digitizing the water & sewer features to create an ESRI geo-database.

The work also involves creation of Map Book for both Water and Sewer utilities of the entire project area.

Description of Actual Services Provided by your Staff:

Pre-production: Convert the Base data Shape File (Source File) to the AutoCAD drawing Format which consisting of City limit, Parcels, Reservoir, Streets. Geo-reference the image (.Jpeg) in the drawing referring the street name specified in the Base data followed by Image name, Drawing name respectively.

Production: Digitize or Draft the Water & Sewer features except hidden or dashed features in the image. Attach the attribute to those features, such as Drawing name, Image name, Manhole elevation, Material, Install date, Diameter referring the information provided in the Access database and in the As-Built.

QA: Check for the Geo-referencing of the image to the corresponding street name and Parcel number and other surrounding details. Checking the missing entities & attributes, Dangling, duplicate features and also check for Continuous network of sewer and water features.

Finalization: Edge matching of Sewer and Water features to make the seamless network Creation of Geo-database of Water & Sewer networks using the shape file.

Project: City of Chino Hills, CA—Water/Sewer Geodatabase and Mapbook Creation		
Client Name: Under NDA		
Project Performance Period	**From:** May 2004	**To:** December 2004
Location of Project: Chino Hills,California		
Brief Description of the services for this project: The City of Chino Hills is located NE of Anaheim Ca, It has a population of @ 66,500 people, covers about a 45 square miles, and has roughly 200 miles of water and sewer pipes. **Services provided :** ▪ Georeferencing ▪ GIS Data conversion from Scanned Water/Sewer plans and creation of the geodatabases for Water and Sewer Networks ▪ Creation of Mapbooks - a series of atlas maps of the service area network of 8.5*11 size with proper annotation placement.		

Project: City of La Mesa. CA —Water/Sewer Geodatabase QC		
Client Name: Under NDA		
Project Performance Period	**From:** June 2005	**To:** July 2005
Location of Project: La Mesa,California		
Brief Description of the services for this project: **Services provided :** ▪ QC, correct and update the City of La Mesa's sewer geodatabase, attributes, and map book		

Project: GIS Cleanup of Floodplain Mapping		
Client Name: Under NDA		
Project Performance Period	**From:** August 2005	**To:** Sept 2005
Location of Project: 3 counties in USA		
Brief Description of the services for this project: **Services provided :** 1. To "clean up" the floodplain mapping in three Counties. Clean up means to attribute the 100 year and 500 year floodplains on both the polylines and polygons and digitize missing floodplain boundaries. a. Make sure the polylines and polygons have arc/node topology. The datasets must not contain slivers or dangles. 2. The final deliverable was arc and polygon files that contains all floodplain boundaries for the entire county that that meet FEMAs Guidelines & Specifications Appendix L.		

Project: City of Tampa 911 Street Network Correction		
Client Name: subcontract from Advanced Mapping – City of Tampa		
Project Performance Period	**From:** Feb 2005	**To:** March 2005
Location of Project: Tampa,Florida		

Brief Description of the services for this project:

Services provided: The scope of the project is to correct the "not true to ground" situation and update associated attributes (street name, address range) of its roads centerline to support for geocoding.

Assignment Name : FERC – Plats mapping (pipeline)	**Country :** USA
Location within Country: Texas	**Professional Staff Provided by your firm:**
Name of Client : Under NDA	**No. of Staff** : 5
Address:	**No. of Staff Months** : 7.5
Start Date (Month/Year) February 2006 / **Completion Date** (**Month/Year**) April 2006	
Name of Association Firm(s) if any:	**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:

The Plats (Parcels / Property sketches) to be platted individually to individual drawings in DWG format corresponding to the Layout size (8"X11")

Input files include Property Shapes ("Zone 14 Plat base.dwg"), Alignment Sheets in PDF format, List of Land Owners and Drawing Layout.

- **Phase-1**

Marshall, Nemaha, Brown and Doniphan Counties of **Kansas** State, Buchanan, Clinton, Caldwell, Carroll and Chariton Counties of **Missouri** State, Gage and Jefferson Counties of **Nebraska** State.

- **Phase-2**

Weld, Logan and Sedgwick Counties of **Colorado** State, Laramie County of **Wyoming** Sate, Kimball, Perkins, Lincoln, Dawson, Frontier, Gosper, Phelps, Kearney, Franklin, Webster, Nuckolls and Thayer of **Nebraska** Sate.

Description of Actual Services Provided by SECON:

1. Access the CAD drawing and Select Layout "Model ". With the aid of the PDF file, locate tract 001 in the Model Space, determine the XY center co-ordinate for the tract 001 X=2266631.75, Y=14534498.51. Use this Coordinate to zoom the view in paper space to locate the tract to be drawn. Use "8.5x11H "Border for this drawing.

2. Select Layout 8.5x11H. Highlight the Viewport (layer VP) and access the properties dialog box. Under Misc. select "Display Locked "to unlock the display. Then select "Custom scale ". Select any below mentioned scale to fit the border of the tract within the Viewport.

Scale is calculated by (1 divided by the potential Scale) 1 / 500 = .002
Engineering scales used are 10, 20, 30, 40, 50, 60, 80, 100, 200, 300, 400, 500, 600, 800, 1000, 2000, etc.

3. Then select model view and select the command “Zoom Center “type in the co-ordinates from step 1. Hit the return twice and the property will appear in the view. Adjust scale in step 2 to fit tract in the border. Once the scale is adjusted, in properties lock the display by selecting " Display Locked "

4. In Paper Space trace over the drawing entities using the following layers.
(Existing Pipeline, Proposed Alignment & P.I.'s Features)

Line Work		**Layer**
Property Line	-	Property Line
Section Line	-	Sec
State Line	-	STATE_LINE
Existing Pipeline	-	Exist PL
Proposed Alignment	-	Prop Alignment

Turn off Viewport. Start adding Bearings and distance labels in the model space. Show bearings to the nearest Min & distance to the nearest foot. Ties to the corners of the property should be measured in model space. Sections, County and State names are extracted from the given input i.e. PDF's. Name of land owners are found on the line list XLS file. The Rods are calculated by measuring the total distance across the subject property in model space and dividing by 16.5. (16.5 Ft. = 1 Rod).

Calculation of the New Permanent Easement Acres (Ac.) & Temp.
Construct Workspace Acres (Ac.). In model space draw a shape the limits of the Permanent Easement (Perm RW layer) crossing the tract. Then use the command Tools / Inquiry / Area. Then select O for Object and select the shape. It should give you the area of 125011.78 sq. ft. this divided by 43560 (1 Ac. = 43560 sq. ft.) I.e. in acreage. 2.87 Ac.

Do the same for the boundaries for the 2 Temp Work Space (Temp WS layer) Shape on South Side = 171501.50, North Side = 23321.01

Total = 194822.51 / 43560 = 4.47 Ac. Leave the shapes on in the file (Calc Temp WS layer & Calc Perm RW layer).

As deliverable the individual drawings for Parcels / Owners in DWG format are submitted to GIE.

Project:		
Peace Creek—Contour Digitization from Aerial Photos and DTM creation		
Client Name: Under NDA		
Project Performance Period	**From:** August 2003	**To:** March 2004
Location of Project: Peace Creek,Florida		

Brief Description of the services for this project:
Services provided :

- Georeferencing
- Digitization of contours and break lines from scanned aerial photographs

8. ISO Certificate

BUREAU VERITAS
Certification

Certification

Awarded to

SECON

SECON PRIVATE LIMITED

PLOT NO. 147, 7B ROAD, EXPORT PROMOTION INDUSTRIAL PARK (EPIP), WHITEFIELD, BANGALORE – 560 066, KARNATAKA, INDIA.

Bureau Veritas Certification (India) Private Limited certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the standard detailed below

STANDARD

ISO 9001:2008

SCOPE OF SUPPLY

BUSINESS DEVELOPMENT, PROCESSING OF INFORMATION FROM TOPOGRAPHICAL SURVEY AND GEO TECHNICAL INVESTIGATIONS, INVESTIGATION AND DATA MANAGEMENT FOR PIPELINE TRANSPORTATION, PIPELINE INFORMATION MANAGEMENT SYSTEM, DESIGN & INVESTIGATIONS FOR IRRIGATION, HIGHWAY & PUBLIC HEALTH ENGINEERING PROJECTS INCLUDING RELATED STRUCTURES, QUALITY CONTROL, PROJECT MANAGEMENT, TOWN PLANNING AND URBAN DEVELOPMENT, GIS & MIS SOFTWARE DEVELOPMENT, PHOTOGRAMMETRY, LIDAR & CAD SERVICES RELATED TO THE ABOVE.

PERMITTED EXCLUSION (S)

Nil.

Original Approval Date: 21 November 2003

Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until: 20 November 2012

To check this certificate validity please call: +91 22 6695 6300

Further clarifications regarding the scope of this certificate and the applicability of the Management System requirements may be obtained by consulting the organisation.

Certificate Number: IND96623/R1 *Date:* 09 February 2010

R. K. SHARMA
Director

Bureau Veritas Certification acting the accreditation certificate number 008

UKAS QUALITY MANAGEMENT

008

Certification / Managing Office Address: "Marwah Centre" 6th Floor, Krishanlal Marwah Marg, Opp. Anza Industrial Estate, Off Saki Vihar Road, Andheri (East), Mumbai – 400 072, India.