AS-BUILT SURVEY OF KWARA STATE POLYTECHNIC,

(A CASE STUDY OF KWARA STATE POLYTECHNIC MINICAMPUS)

OFF GENERAL HOSPITAL TO SAWMILL GARAGE ROAD, ILORIN WEST LOCAL GOVERNMENT AREA, KWARA STATE.

PRESENTED BY

ILORI WARIS OPEYEMI

MATRIC NUMBER: ND/22/SGI/PT/012

TO

THE DEPARTMENT OF SURVEY AND GEOINFORMATIC,

INSTITUTE OF ENVIROMENTAL STUDIES,

KWARA STATE POLYTECHNIC, ILORIN.

INPARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF NATIONAL DIPLOMA IN SURVEYING AND GEOINFORMATICS.

JUNE,2025.

CERTIFICATE

I **Ilori Waris Opeyemi,** with the **Matriculation number ND/22/SGI/PT/012** here by certify that all the information given in this project work was carried out in accordance with the survey Laws, Regulations and departmental instructions. Submitted to the Department of Surveying and Geoinformatics, Institute of Environmental Sciences, Kwara State Polytechnic, Ilorin, Kwara State. Impartial fulfilment of the requirements for award of National Diploma in Surveying and Geoinformatics.

Candidate's Name: **Ilori Waris Opeyemi**

Matric No: **ND/22/SGI/PT/012**

Signature...and Date:…………………………...

CERTIFICATION

CERTIFICATION This project titled "As-built Survey of kwara state polytechnic mini campus, off General Hospital–Sawmill road, Ilorin west local government area, Kwara state. "by **Ilori Waris Opeyemi,** with the **Matriculation number ND/22/SGI/PT/012** meets the regulations governing the award of National Diploma (ND) of Kwara State Polytechnic, Ilorin and it is approved for its contribution to scientific knowledge and literary presentation.

....	....
Surv. Babatunde kabir (Project Supervisor)	Date and Sign
....	....
Surv. R.S. Awoleye Project Coordinator	Sign and Date
……………………………..	……………………………
Surv. I.I. Abimbola Head of the Department	Sign and Date
……………………………..	……………………………
External Examiner	Sign and Date

DEDICATION

This project is dedicated to Almighty Allah, my supportive parents, and to all those who have inspired me to push beyond limits and stay committed to excellence in surveying

ACKNOWLEDGEMENT

First and foremost, I give glory to Almighty Allah for His divine help in the successful completion of this As-Built Survey project. I extend my sincere appreciation to my project supervisors, Surv. Babatunde and Surv. A.I. Isau, for their tireless efforts, guidance, and patience during the entire process.

I also recognize the academic contributions of the lecturers and staff of the Kwara State Polytechnic, Ilorin. I am thankful to my parents and loved ones for their unflinching support and prayers.

ABSTRACT

This project report on As-built survey of Kwara Polytechnic, Ilorin mini campus, the project was aimed at producing an As-built survey plan of the polytechnic, this aim and the objectives were achieved through the following scopes, recce survey, project planning, data acquisition, data processing and report writing. The methodology employed includes preliminary reconnaissance, checking of control points using Total station, data collection with a Total Station, and data processing was done using autoCAD2007 and the information presentation in both hard and soft copies. The acquired data were processed and analyzed to generate an as-built plan that aligns with planning standards and legal requirements for building and academic construction standard.

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CHAPTER ONE

CHAPTER ONE

1.0 Introduction

An *As-Built Survey* refers to the precise documentation of a construction project as it was actually completed, rather than how it was initially designed. This survey captures all physical and structural changes that occurred during construction, including modifications, deviations from the original plan, and unforeseen adjustments. These records are essential not only for validating the completion of a project but also for ensuring that all components comply with regulatory standards and design intentions. Without accurate as-built documentation, future maintenance, renovations, or legal verifications can be hindered due to discrepancies between the planned and constructed environments (Barazzetti et al., 2015).

Modern technologies such as 3D laser scanning, photogrammetry, and Building Information Modeling (BIM) offer more precise and efficient means of conducting as-built surveys, their adoption remains limited, particularly in small and medium-sized construction firms or in developing regions. Barriers such as high implementation costs, insufficient training, and poor integration into existing workflows prevent many stakeholders from leveraging these tools. As a result, there is a growing need to examine the shortcomings of current as-built survey practices and to identify feasible strategies for improving accuracy, efficiency, and accessibility through digital innovation.

The importance of as-built surveys has grown significantly with the advancement of digital surveying technologies. Traditional manual methods, while still in use, are increasingly being supplemented or replaced by high-precision tools such as 3D laser scanning, photogrammetry, and drone mapping. These technologies offer efficient, non-invasive, and highly accurate methods of capturing the real-world conditions of completed structures (Tang et al., 2010). By creating detailed 3D models and point clouds, surveyors can identify even the smallest discrepancies between design specifications and actual construction, improving project quality and minimizing risks.

The critical role that *As-Built Surveys* play in accurately documenting completed construction projects, many developments suffer from discrepancies between the original design and the final construction due to inadequate or outdated surveying methods. Traditional techniques—often manual and time-intensive—struggle to capture complex changes that occur during the construction phase, leading to incomplete or inaccurate records. These gaps not only hinder future renovations and facility maintenance but can also result in regulatory non-compliance, legal disputes, and increased operational costs. The lack of reliable as-built data ultimately compromises the long-term value and safety of built infrastructure.

1.1 Statement of Problem

In many construction projects, discrepancies often arise between the original design and the actual construction. This can lead to future design challenges, legal issues, or costly alterations. Lack of accurate and up-to-date records of existing conditions can also hinder maintenance, expansion, or demolition works. Therefore, there is a need for a reliable method to capture and document existing structures precisely as they are built, especially for academic institutions like the project area.

1.2 Aim of the Project

The aim of this project is to conduct an accurate as-built survey of an existing structure or infrastructure to provide detailed, verifiable documentation of its actual conditions upon completion, specifically for the project area.

1.3 Objective of the Project

i. To identify and record deviations from original design plans.

ii. To produce precise drawings that represents the existing physical state of the project.

iii. To produce a record surveying plan of the under-construction structure using the total station.

iv. To enhance understanding and application of geospatial techniques in post-construction documentation.

1.4 Scopes of the Project

This project focuses on conducting an as-built survey for a selected site, including the collection of field data, data processing, and generation of final as-built drawings. It covers planimetric and elevation features but excludes sub-surface or utility surveys Successful execution of this project involved the following scopes:

i. Project planning.
ii. Field reconnaissance.
iii. Data acquisition.
iv. Data processing.
v. Information presentation.
vi. Technical report writing

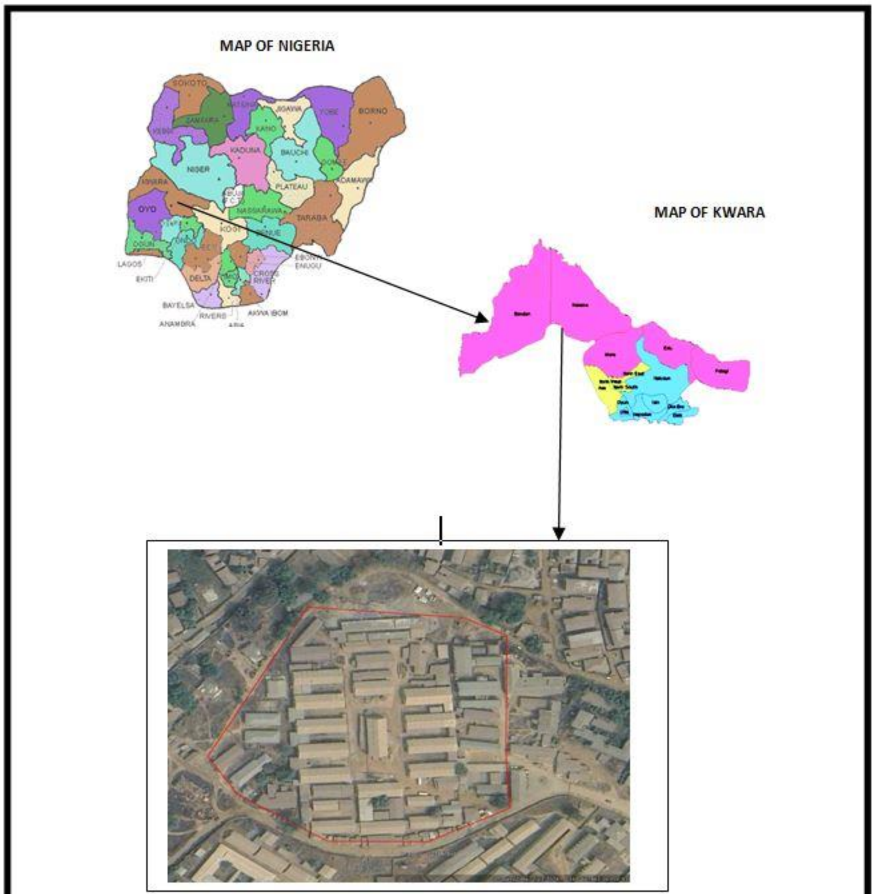
1.5 Project Specifications

The specifications on this project involve the rules and regulations guiding the practice and processes of surveying, which are:

i. Connection of the survey to national framework (control pillars).
ii. A close traverse must be laid out for the perimeter survey to ensure checking on the final survey work.
iii. Provision of the back computation sheet to show the list of the coordinates used for the perimeter survey.
iv. Linear accuracy of the survey work must be done accurately.
v. The plan to be produced must be a signed using standard as-built plan scales.

1.6 Project Location Description

The project site is located along Kwara state polytechnic Mini-Campus, inside university of Ilorin Mini-Campus, Off General Gari Alimi road, Ilorin-west local Government Area of Kwara State. Approximately the site is located on latitude 8°28'53.20"N ; longitude 4°31'37.75"E and 8°28'55.41"N; 4°31'30.28"E and the imagery below show the project area.



Google Earth imagery of The Study Area

1.7 Personnel Involved

The following are the members of the group that was involved in the as built survey project work, they are;

S/N	Names	Matric No	Role
1.	Ilori Waris Opeyemi	ND/22/SGI/PT/0012	Author

2.	Wasiu Abdulganiyu Bayonle	ND/23/SGI/PT/0001	Member
3.	Sakariyahu Abdulganiyu	ND/23/SGI/PT/0003	Member
4.	Bello Muhammad Abdullateef	ND/23/SGI/PT/0002	Member
5.	Ibrahim Aishat Khadijat	ND/23/SGI/PT/0007	Member
6.	Yahya Ridwan	ND/23/SGI/PT/0006	Member
7.	Betiku Funmilola Oyinkannsola	ND/23/SGI/PT/0005	Member
8.	Solayinka Mujeeb Olanrewaju	ND/23/SGI/PT/0004	Member

CHAPTER TWO

2.0 Literature Review

In the field of construction and civil engineering, maintaining accurate documentation of a project's actual layout and physical configuration is critical for both current project execution and future facility management. As-built surveys serve this essential role by capturing the precise dimensions and locations of constructed elements upon project completion or during various stages of construction. These surveys compare the built structure to the original design, identifying discrepancies and ensuring that any modifications made during the construction process are properly documented. As-built surveys are indispensable for architects, engineers, facility managers, and contractors, particularly in complex projects such as bridges, highways, commercial buildings, and industrial facilities (Sampaio & Henriques, 2018). Their significance has increased with the adoption of Building Information Modeling (BIM) and other digital technologies that demand real-time and accurate project data.

An as-built survey is a detailed representation of a construction project as it was actually constructed, rather than as it was originally designed. This survey captures all the changes and deviations from the initial blueprints that occur during construction due to site conditions, design alterations, or errors in execution (Ayeni et al., 2020). It involves measuring, documenting, and mapping structural elements and utilities as they exist, which serves as an authoritative reference for final project approvals, asset management, and renovations. Unlike design drawings, which are predictive and idealized, as-built drawings are retrospective, capturing the completed work's real-world conditions.

Various methods are employed to conduct as-built surveys, depending on the scale, complexity, and required accuracy. Traditional techniques involve total stations and GPS instruments to measure and map coordinates. These are still widely used for simple or linear projects like roadways or pipelines. However, for complex buildings and infrastructure, advanced technologies such as 3D laser scanning (LiDAR) and photogrammetry have become the standard. These technologies provide high-resolution, three-dimensional representations of existing structures, making it easier to capture minute details (Tang et al., 2010). Laser scanners emit thousands of laser beams per second to capture the spatial geometry of surfaces, while drones equipped with photogrammetric cameras provide aerial images to map larger areas efficiently. Data from these methods are processed using CAD or BIM software to produce accurate and scalable as-built models (Volk et al., 2014).

The result of an as-built survey is a comprehensive set of drawings or digital models that reflect the exact status of a project post-construction. These include locations of walls, columns, plumbing, HVAC systems, electrical networks, and other structural or architectural features. The findings from as-built surveys are crucial for quality control, ensuring regulatory compliance, and settling disputes between stakeholders (Dore & Murphy, 2012). When integrated with BIM, the results not only support facility management but also aid in predictive maintenance, retrofitting, and future upgrades. In many projects, discrepancies revealed by as-built surveys have prevented costly errors in renovation or expansion phases. For instance, in infrastructure projects, they can help utilities companies avoid damaging existing underground pipes and cables during excavation.

As-built surveys are an essential component of modern construction and infrastructure development. They provide an accurate record of the built environment, support legal and regulatory documentation, and enhance the efficiency of maintenance and renovation operations. The evolution of survey methods, especially the integration of 3D scanning and BIM, has greatly improved the accuracy and utility of as-built documentation.

As-built surveys are an essential component of modern construction, ensuring that the actual built structure aligns with or documents deviations from the original design. These surveys are crucial during and after construction for quality assurance, regulatory compliance, and facility management. Their importance has grown with the integration of digital tools such as BIM and 3D scanning technologies (Volk et al., 2014).

An as-built survey is a process of documenting the physical state of a structure or site after construction, capturing all alterations and differences from design plans. It results in accurate representations, such as drawings or digital models, used for future renovations, operations, or legal records (Ayeni et al., 2020).

Common methods include total station and GPS-based surveying for basic measurements. For higher accuracy, 3D laser scanning (LiDAR) and photogrammetry are used to produce detailed point clouds and models. These are processed with CAD or BIM software to create precise as-built documentation (Tang et al., 2010).

As-built surveys produce final drawings or models that reflect the real-world state of the structure. These outputs support project verification, client handover, asset management, and help prevent errors in future construction phases. In many projects, they are also used to detect construction deviations and support claims or disputes (Dore & Murphy, 2012).

As-built surveys play a pivotal role in delivering accurate post-construction data. They enhance project transparency, reduce future errors, and are becoming increasingly vital with the adoption of digital construction practices. Investing in modern surveying methods significantly improves project outcomes and lifecycle management.

The as-built survey is a vital component of construction and civil engineering, capturing the exact state of a built structure for comparison with design plans. It serves as a critical reference for ensuring compliance, managing infrastructure, and planning future modifications. With advancements in digital technology, the process has become faster, more accurate, and more widely adopted across projects (Sampaio & Henriques, 2018).

An as-built survey is the systematic documentation of a completed construction project that reflects the actual positions and dimensions of all components as they were constructed, not merely as they were designed. It is essential for identifying variations, updating records, and ensuring a reliable foundation for operations and maintenance (Ayeni et al., 2020).

Traditional methods such as tape measurements and total stations have evolved to include modern technologies like GNSS, LiDAR (3D laser scanning), and drone-based photogrammetry. These tools gather highly accurate spatial data that can be processed using AutoCAD or BIM software, yielding detailed 2D or 3D models of the completed structure (Tang et al., 2010; Volk et al., 2014).

The outcome of an as-built survey is a set of precise drawings or models that serve as the definitive representation of a structure. These deliverables are used for facility management, maintenance, future renovations, and legal documentation. They also help reduce construction disputes by providing a clear record of the completed work (Dore & Murphy, 2012).

As-built surveys provide indispensable post-construction documentation, offering a clear picture of what was actually built. As the demand for digital construction and smart facility management grows, integrating accurate as-built data becomes more essential. Embracing modern surveying technologies ensures greater accuracy, efficiency, and long-term value in project management.

In the construction and civil engineering industry, the accuracy of built structures compared to their initial designs is critical for safety, functionality, and future modifications. As-built surveys provide a vital record of what was actually constructed, supporting decision-making in maintenance, renovations, and compliance (Mahdjoubi et al., 2015). These surveys bridge the gap between design intent and construction reality. An as-built survey is a detailed documentation process that records the true dimensions, locations, and specifications of a completed or partially completed structure. Unlike design drawings, as-built records reflect real-world changes and adjustments made during construction (Ashmore et al., 2021). These are often used for facility management, legal validation, and future project planning.

Techniques used in as-built surveys range from manual measurements and total station surveys to advanced technologies like LiDAR (Light Detection and Ranging), photogrammetry, and UAV (drone) mapping. These methods provide accurate 3D models and point cloud data, which are processed with AutoCAD or BIM software to generate reliable documentation (Ghaffarian hoseini et al., 2017).

As-built surveys result in precise digital or printed records that show the actual state of construction, including any deviations from the original design. These records are used to ensure project compliance, support maintenance, and facilitate upgrades. They also reduce the risk of errors and improve stakeholder communication throughout the facility's lifecycle (Sacks et al., 2018).

As-built surveys are indispensable tools in ensuring accuracy, compliance, and efficiency in construction projects. Their role has become even more critical with the adoption of digital tools that integrate design and reality. Accurate as-built documentation not only supports project delivery but also ensures long-term asset management and sustainability.

CHAPTER THREE

3.0 Methodology

This aspect refers to a system of methods and principles, rules used in a field of study to achieve the aim and objectives of this project. The modality to successful execute this project was carried out based on the survey rules and regulation, supervisor advice and departmental instructions.

3.1 Reconnaissance

Reconnaissance survey is a preliminary stage for exploratory investigations conducted to gather initial data concern the choice of Site area of Subject before more detailed research or filed work commenced. Reasons for reconnaissance survey of the project area are the following;

i. To know the location of the site.
ii. To determine the preliminary area/perimeter of the land.
iii. To know the survey method suitable for the field data acquisition and the instrument need for the it.

Reconnaissance in this project involved preliminary investigations to gather information about the survey area before conducting a detailed survey, reconnaissance of this project was carried out in two way namely as follows.

i. Office planning
ii. Field Reconnaissance

3.1.1 Office Planning

It involved the process adopted in the collection of relevant data and specification about the as-built Surveying with the used of traversing survey method. During the office planning the given coordinate for control point HND2001, TBM0110, and HND2002, was obtained and computed as shown in the table 3.1 below. The choice of equipment to be use for project was obtained from the survey store in the department of surveying and Geoinformatic, Kwara State Polytechnic, Ilorin, and it was handled accordingly to the survey rules and regulations and departmental instruction.

TABLE 3.1 Showing the list of the coordinate of the control pillars used

Stations	Northing (m)	Easting (m)	Remark
HND2001	937892.5580	668076.4680	Given
TBM0110	937900.4120	668069.5750	Given
HND2002	937909.7109	668061.2683	Given

3.1.2 Field Reconnaissance

Field recce and site visitation was conducted as preliminary survey for investigation of the basic information about a specified project area, location, or subject in the field. It allows the members of the groups to be familiar with the terrain, boundary lines, selection number of station required, Equipment that will be used for the job, pillars number HND2001, TBM0110, and HND2002 used as a control for the project and so on. The stations points selected was Inter-visible to one another and finally a reconnaissance diagram was produced which was attached to this project

RECCE DIAGRAM

3.2 Instrument Selection

The equipment used for this project was grouped into two categories;

i. Hardware

ii. Software

3.2.1 **Hardware used**

i. Total Station with its Accessories (KTS-442L)

ii. Reflector poles

iii. Field book

iv. Writing material (pen)

v. Survey beacons

vi. Steel Tape (5m)

vii. Tripod Stand

3.2.2 **Software used**

Below are the list of the software used during the project processing;

i. AutoCAD 2007

ii. Notepad

iii. Microsoft word

iv. Microsoft Excel

3.3 Instrument Test

The instrument test was carried out before it used for angular observation. The purpose of testing the instrument before used is to know the assurance and maybe other instrument is in good Condition the instrument was set up over station A and it was pointed a Sighted to station B whore a pole Is hold, and the angle was recorded for face left the instrument was turn to farce right on the same point and it was sighted to station B, where a pole is held at the same position and the angle was recorded. The distance between station A and B 1s 10m. The steel tape was hold at 60m an point A and it was extend to point B. the results for the instrument test was shown i to figure 3.3 below and table 3:2 below.

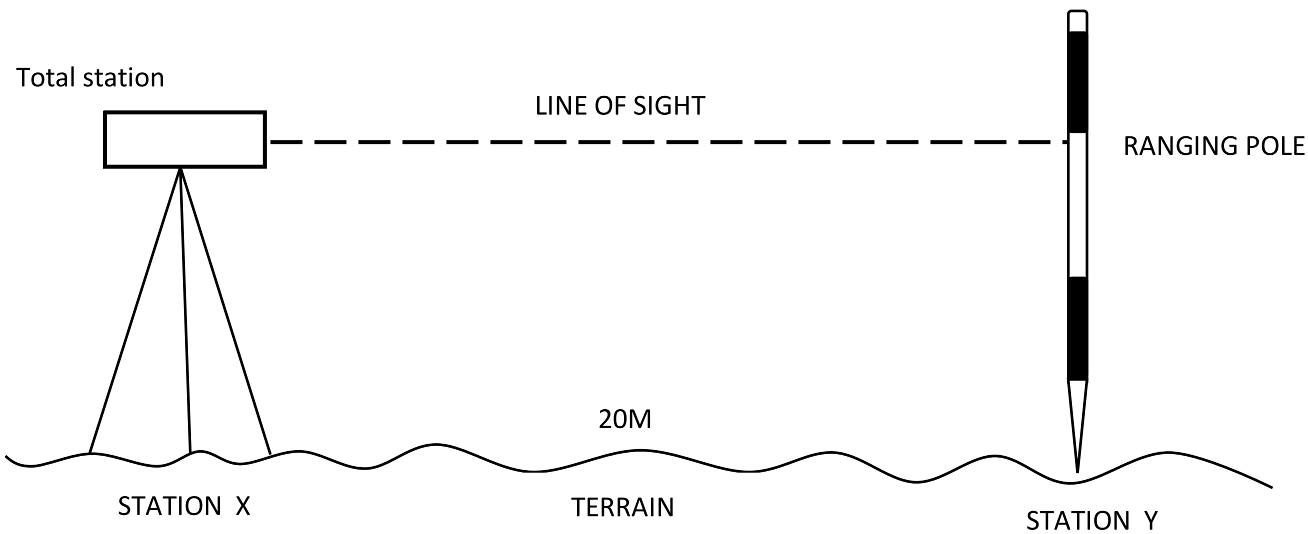


Figure 3.1 showing the instrument set up for collimation test

Table 3.2 showing the test of instrument result

STATION	SIGHT	FACE	HORIZONTAL READING	DEDUCED ANGLE
A	B	L	180° 00’ 03”	
	B	R	00°00’ 00”	180° 00’ 03”

Different in horizontal circle reading: 180° 00’ 03’’

Horizontal collimation error

= 180° 00’ 03’’

= 000° 00 03’’

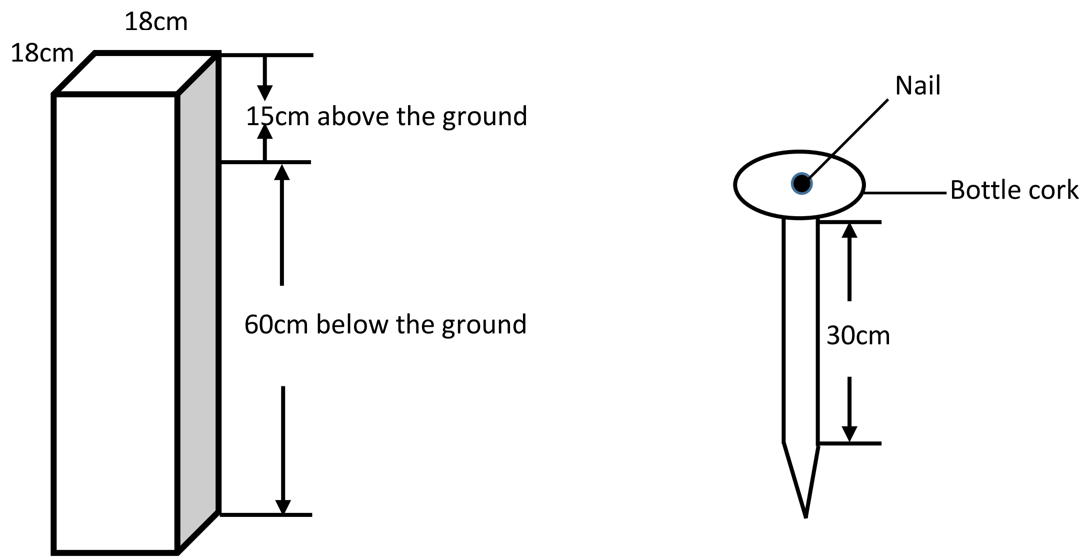
Collimation error = $\frac{00°\,00'03"}{2}$

Horizontal collimation error = 00° 00’ 01”

Because the collimation error falls within the allowable 01”. The instrument was in good condition.

3.4 Monumentation

This is the process in which the beacon is being buried in to ground. On the project site there are same existing beacons on the boundary lines m, nail with cap (bottle cork) was used as the station pegs.



PILLAR PEG

FIGURE 3.4 Diagram and Dimension of Pillars buried

3.5 CONTROL CHECK

The Control check was carried out to know the control point HND2001, TBM0110, and HND2002 are still in their positions. The instrument was set on Control FP01107 and the temporary adjustment was carried out i.e centring, levelling, and focusing. Back site was taken to control HND2001 and it was recorded.

The fore sight was served to PEG1 and it was recorded Steel tape was used to measure the distance between TBM0110 and PEGI and it was recorded. The data observed was computed for given coordinate and Observed Coordinate, as shown in the table 3.2 below.

TABLE 3.2 THE GIVEN COORDINATE OF THE CONTROL POINTS

Stations	Northing (m)	Easting (m)	Remark
HND2001	937892.558	668076.468	Given
TBM0110	937900.412	668069.575	Given
HND2002	937909.711	668061.268	Given

TABLE 3.3 The Backward Computation for the Given Controls pillars

From station	**Bearing**	**Distance**	ΔN	ΔE	**Northing (m)**	**Easting (m)**	**To station**
					937892.558	668076.468	HND2001
HND2001	318° 43' 42''	10.472	7.854	-6.893	937900.412	668069.575	TBM0110
TBM0110	318° 13' 33''	12.469	9.299	-8.307	937909.711	668061.268	HND2002

TBM0110 to HND2002 BEARING = 318° 13' 33'' DISTANCE = 12.469m

HND2002 to TBM0110 BEARING = 138° 43' 42'' DISTANCE = 10.472m

TABLE 3.4 Show the Observed Coordinate of the Controls Pillars

Stations	Northing (m)	Easting (m)	Remark
HND2001	937892.550	668076.460	Observed
TBM0110	937900.412	668069.575	Observed
HND2002	937909.715	668061.271	Observed

TABLE 3.5 Show the Backward Computation for the Observed Control Pillars

From station	Bearing	Distance	ΔN	ΔE	Northing (m)	Easting (m)	To station
					937892.550	668076.460	HND2001
HND2001	318° 43' 25’’	10.451	7.862	-6.885	937900.412	668069.575	TBM0110
TBM0110	318° 14' 51’’	12.470	9.303	-8.304	937909.715	668061.271	HND2002

TBM0110 to HND2002 BEARING = 318° 13' 51’ DISTANCE = 12.470m

HND2002 to TBM0110 BEARING = 138° 43' 25’’ DISTANCE = 10.451m

Therefore the difference between the given and observer bearing was 00° 00’ 19” and 00° 00’ 17” and the difference between the given and the observer linear distance was 0.003m and 0.021m the results obtained fall within the allowable accuracy for both angular and linear observation.

It was concluded the instrument was in good condition and fit to be used for the project.

3.6 Data Aquisition

This was carried out on the field using Total station with its accessories (KTS-442L) was used for coordinating the entire site for both the perimeter and details of the site. The Total station was set on the control Pillar TBM0110, and the temporary adjustment was carried out centering, leveling and focusing. The coordinates of the occupied station was input after that the coordinates of the backsight HND2001 was record as well and the observation was done to backsight pillar and the coordinates was take and check against the given. Having check and found accurate then the perimeter survey commenced for the entire project site.

3.6.1 Detailing Survey

The detailing survey was done immediately after completely carried out the perimeter traverse to determine the position of the features on the Site was fixed using radiation survey method. During this several stations was established to pick the coordinates of the details and the coordinates was stored on the total station as its observed. This was later downloaded. The details that was picked during the detailing survey was coded in different ways like Building edges as ‘BLD’, Electric Poles ‘EP’, Drainage ‘DR’, Roads Line ‘RD’, Spot Height ‘SP’ and so on.

CHAPTER FOUR

4.0 Data Processing

This involved several step to ensure accurate and reliable result. It explains the method used in capturing; processing, downloading, and analyzing the data acquired Data reduction in surveying involves various methods to simplify and summarize the collected data for analysis. These are some common methods of data reduction that involves

- Combining multiple values into a single value. The average value is calculated by summing up all the values and dividing by the number of values.
- Least Square Adjustment (LSA) is a method of data reduction that involves minimizing the sum of the squared errors between observed and calculated values.
- Interpolation is a method of data reduction that involves estimating values between observed data points.
- Spatial data reduction refers to the process of simplifying and reducing the complexity of spatial data, such as geographic information system (GIS) data, while preserving its essential characteristics.

4.1 Data Editing

- Open excel
- Click on the desire file
- Set to delimited
- Click on next
- Mack space and comma
- Click
- On next

- Then click on finish

4.3 Data Processing Using Autocad

The plan produced digitally with AutoCAD software. The following are the procedure used:

STEP 1: Open Notepad

Open Notepad on your computer. You can find it in the start menu (Window)

STEP 2: Create a New File

Click on "file" "New" to create a new file

STEP3: Enter Coordinates

Enter your coordinates in the following format:

X. Y. Data

STEP 4: Save the Fil

Click on "File" > "Save as" and choose a location to save your file. "ALADA Coordinate" txt, and select "All files" as the file type.

Importing the Coordinate File Into 2007 AutoCAD

STEP 1: Double click AutoCAD

Go under format

Click on format after that pick your unit

Drawing unit

Type.... Decimal

Precision... 0.000

Angle type Degree/Min/See

Precision Od00

Clockwise.... 노

Unit to scale Meters

Direction control North 270d0

Press "OK"

STEP 2: Create a new drawing

Click on "File" > "Name" to create a new drawing

STEP 3: Import the coordinate file

Click on "Tools" >"Reference" > "Import" and select "ALADA coordinate (.txt)" as the file type. Navigate to the location where you saved your coordinate file ("ALADA coordinate .txt") and select it.

STEP 4: Configure Import Setting. In the import select "Point" as the object type and choose the correct coordinate format (eg. X and Y) click "OK" to import the coordinates.

4.4 Data Extraction

The data recorded in the field book was picked to compute for the bearing and distance. Forward computation and backward computation after all necessary correction have been applied. Correction like slope correction, tension correction and standardization correction.

4.3 Back Computation

The result get for forward computation was used for Back computation.

The following program was required for back computation

i. Input N2-N1 to get ΔN

ii. Input E2-E1 to get ΔE

iii.Input $\sqrt{(\Delta N^2 + \Delta E^2}$ to get distance

iv.Input shift tan $\frac{\Delta E}{\Delta N}$to get the corrected bearing when there us more station repeat step ¡¡¡ and ii.

Table 4.1 Showing Boundary Coordinates

Station	Northing (m)	Easting(m)	Remark
PIL1	937720.924	668157.605	Observed
PIL2	937720.560	668042.167	Observed
PIL3	937748.847	667988.759	Observed
PIL4	937788.194	667965.709	Observed
PIL5	937930.248	668056.923	Observed
PIL6	937924.001	668159.813	Observed

Table 4.1.1 Showing back computation for the boundary coordinate

Station form	Bearing	Distance	ΔN	ΔE	Northing	Easting	Station to
					937720.924	668157.605	PIL 1
PIL1	89° 49’ 09’’	115.484	0.364	115.438	937720.560	668042.167	PIL 2
PIL 2	117° 54’26’’	45.302	-28.287	53.408	937748.847	667988.759	PIL 3
PIL 3	149° 38’ 15”	31.887	-39.347	23.05	937788.194	667965.709	PIL 4
PIL 4	180° 35’ 31”	108.901	-142.054	-91.214	937930.248	668056.923	PIL 5
PIL 5	253° 31’ 46”	102.700	6.247	-102.89	937924.001	668159.813	PIL 6
PIL 6	360° 00’ 39”	203.082	203.077	2.208	937720.924	668157.605	PIL 1

4.4 Area Computation

TABLE 4.1.2 showing area computation for the boundary coordination using double latitude

ΔE	ΔN	PRODUCT
115.438	X 0.364	= 42.019432
115.438		
230.876		
53.408		
284.284	X -28.287	=-8041.541508
53.408		
337.692		
23.05		
360.742	X -39.347	=-14194.11547
23.05		
283.792		
-91.214		
292.578	X -142.054	= -41561.87521
-91.214		
201.364		
-102.89		
98.474	X 6.247	= 615.167078
-102.89		
-4.416		
2.208		
-2.208	X 2203.077	= -448.394016
2.208		
0.000		

= 42.01943 – 8041.541508 – 14194.11547- 41561.87521+ 615.167078 – 448.394016

= -63588.73969\2

= 31794.36985m²\10,000.

= 3.1794 HECTRES

4.5 PLAN PRODUCTION

All the plan were produces in both soft copies and hard copies, the hard copies were shown on the appendix page attached with the project.

CHAPTER FIVE

5.0 SUMMARY, PROBLEMS ENCOUNTERED, CONCLUSION, RECOMMENDATION

5.1 SUMMARY

In order to determine the shape, size and location of the Kwara state Polytehnic Mini Campus, reconnaissance was carried out which helps in taking further decisions. Beacons were coordinated using total station with the help of existing control points very close to the project site. Data were downloaded and processed using appropriate AutoCAD 2007 software and the final adjusted coordinates of the perimeter were used to plot the boundary and other details . The resulting plan was printed in scale 1: 2,500. A comprehensive Technical report was prepared and printed.

5.2 PROBLEM ENCOUNTERED

i. Too much of rainfall which does not allowed site
ii. Unavailable of the group members due to dean's cup football tournament
iii. While taking observing there are some object obstructing the view when taking the observation e.g electric pole, building, tree etc.

5.3 RECOMMENDATION

The department should considered the season and time that the students should be given the terminal project.

5.4 CONCLUSION

At the end the aim and objective of this project was achieved. It was carried out using third order surveying method this project was carried out in accordance with survey rules and regulation and departmental instruction.

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Raw Data

Name	Code	E	N	h		PT260	SH	668115.4	937791.5	317.946
PT1	ST17	668069.6	937900.4	324.137		PT261	SH	668118	937790.7	318.041
PT2	CV	668071.1	937900.4	324.553		PT262	SH	668117.7	937795.6	317.967
PT3	CV	668072	937900.3	324.541		PT263	SH	668113.5	937797.2	317.656
PT4	BLD	668072.6	937900.6	324.383		PT264	SH	668110.1	937800.8	317.647
PT5	BLD	668066.5	937905.8	323.724		PT265	SH	668110.4	937806.9	317.571
PT6	SH	668069.7	937897.9	324		PT266	SH	668114.1	937808.4	317.326
PT7	SH	668072.6	937896.1	324.671		PT267	SH	668117.8	937810	317.601
PT8	SH	668072.2	937891.5	324.604		PT268	SH	668117.6	937814.7	317.532
PT9	SH	668076.5	937892.6	324.821		PT269	SH	668113.8	937816	317.212
PT10	SH	668083.2	937892.3	324.831		PT270	SH	668109	937815.1	317.485
PT11	SH	668085.6	937889.4	324.87		PT271	SH	668104.5	937814.4	317.27
PT12	BLD	668085.4	937886.8	324.848		PT272	SH	668104.8	937819.5	317.197
PT13	SH	668088.7	937888.5	324.887		PT273	SH	668109.7	937818.5	317.278
PT14	SH	668090.4	937893.3	324.882		PT274	SH	668113.6	937819	317.192
PT15	SH	668095.3	937895.1	324.957		PT275	SH	668117.7	937821.2	317.334
PT16	SH	668095.6	937891.4	324.958		PT276	SH	668114.1	937823.2	317.152
PT17	BLD	668139.4	937901.3	324.586		PT277	SH	668109	937824.1	317.181
PT18	CV	668139.1	937901.2	316.047		PT278	SH	668104.9	937822.2	317.161
PT19	CV	668139.5	937900.4	316.104		PT279	SH	668105	937825.4	317.107
PT20	CV	668137.3	937899	317.048		PT280	SH	668103.5	937827.1	317.276
PT21	SH	668133.7	937894.7	316.106		PT281	SH	668108.1	937827.2	317.179
PT22	SH	668136.7	937894.8	316.021		PT282	SH	668112	937827.1	317.097
PT23	BLD	668137	937893.5	316.015		PT283	SH	668116.6	937827.5	317.116
PT24	SH	668141.1	937890.4	315.886		PT284	SH	668117.8	937831.4	317.048
PT25	SH	668145.9	937889.2	315.599		PT285	SH	668112.9	937833.2	317.012
PT26	SH	668147.8	937891.6	315.619		PT286	SH	668108.8	937832.7	317.058
PT27	GT	668148.7	937893.4	315.804		PT287	SH	668106.3	937831.7	317.095
PT28	GT	668147.9	937894	315.765		PT288	SH	668120.4	937780	318.343
PT29	BLD	668148.9	937893.2	315.928		PT289	SH	668125.9	937783	318.036
PT30	SH	668148.1	937886.3	315.852		PT290	SH	668122.6	937785.4	318.043
PT31	SH	668144.4	937882.9	315.942		PT291	SH	668120.9	937789.4	318.013
PT32	SH	668140.3	937879.1	316.287		PT292	BLD	668120.6	937791.6	317.908
PT33	SH	668144.4	937877.2	316.236		PT293	SH	668125	937790.3	317.853
PT34	SH	668147.4	937877.9	316.065		PT294	SH	668128.5	937785.7	317.944
PT35	BLD	668149.4	937879.9	315.956		PT295	SH	668133	937781.5	317.952
PT36	BLD	668156.1	937879.6	315.966		PT296	SH	668132.9	937786.5	317.857
PT37	BLD	668156	937874.1	315.966		PT297	SH	668132.2	937790.7	317.807
PT38	EP	668150.9	937875.2	316.093		PT298	SH	668137	937790.8	317.772
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PT42	BLD	668128.4	937894.7	316.378		PT302	SH	668145.5	937786.4	317.727
PT43	SH	668124.8	937894.3	316.451		PT303	SH	668146	937791.2	317.717
PT44	SH	668121.3	937892	316.499		PT304	SH	668149.5	937790.8	317.75
PT45	SH	668118.3	937894.3	316.594		PT305	SH	668149.7	937786.7	317.692
PT46	SH	668115.7	937888.6	316.573		PT306	SH	668148.9	937781.3	317.842
PT47	BLD	668113.6	937886.9	316.529		PT307	BLD	668150.4	937781.4	317.8
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PT51	SH	668104.2	937889.1	316.626		PT311	BLD	668112.8	937763.3	319.05
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PT54	SH	668117.1	937883.2	316.562		PT314	SH	668122.4	937765.5	318.977
PT55	SH	668114.2	937882.6	316.592		PT315	SH	668124.5	937762.3	318.933
PT56	BLD	668113.5	937874.4	316.659		PT316	SH	668122.4	937758.6	318.969
PT57	SH	668115.5	937874	316.641		PT317	SH	668121.7	937753.2	319.012
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PT60	SH	668114.9	937865.7	316.81		PT320	BLD	668113.1	937748.7	319.275
PT61	SH	668112.2	937865.8	317.066		PT321	BLD	668113.2	937730.1	319.819
PT62	BLD	668111.7	937870.2	316.664		PT322	BLD	668118.1	937726.7	320.172
PT63	SH	668124	937868.3	316.542		PT323	BLD	668118.2	937750.2	319.117
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PT65	SH	668128.1	937869.8	316.579		PT325	SH	668124.5	937754.3	318.972
PT66	SH	668127.9	937872.5	316.566		PT326	SH	668125.4	937757	318.942
PT67	SH	668125	937873.8	316.569		PT327	SH	668126.4	937759.8	318.902
PT68	SH	668123.6	937877	316.822		PT328	SH	668127.7	937763.6	318.945
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PT70	SH	668121.7	937869.6	316.558		PT330	SH	668132.3	937766.4	319.052
PT71	SH	668121.5	937862	316.817		PT331	SH	668132.9	937763.9	319.098
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PT78	SH	668111.8	937851.5	317.396		PT338	BLD	668140.6	937755.3	318.91
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PT80	SH	668118.3	937849	316.835		PT340	SH	668136	937762	319.013
PT81	SH	668118.1	937843.1	316.939		PT341	SH	668138.3	937764.7	319.044
PT82	SH	668113.8	937842.7	316.91		PT342	BLD	668139.4	937765.7	319.051

PT83	SH	668108.1	937843.3	317.4		PT343	SH	668141.4	937749.2	319.111
PT84	SH	668106.1	937847.2	317.641		PT344	SH	668143.4	937751	319.05
PT85	SH	668102.4	937849.2	317.563		PT345	SH	668144.9	937753.8	318.948
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PT87	SH	668099.2	937840.3	317.489		PT347	SH	668146.9	937747.9	319.135
PT88	SH	668098.1	937836.4	317.051		PT348	SH	668144.5	937745.9	319.098
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PT91	SH	668102.2	937835.3	317		PT351	SH	668140	937740.1	319.295
PT92	SH	668093	937842.7	317.597		PT352	SH	668141.4	937742	319.263
PT93	SH	668090.5	937849.3	317.02		PT353	SH	668145.1	937740.6	319.475
PT94	SH	668088	937845.4	317.154		PT354	SH	668147.6	937743.1	319.297
PT95	CV	668089.1	937840.1	317.01		PT355	SH	668149.8	937746.8	319.15
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PT97	CV	668089.7	937835.1	316.97		PT357	SH	668153.9	937753.9	319.13
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PT103	SH	668079.2	937850.8	316.576		PT363	BLD	668157.6	937720.9	319.595
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PT105	SH	668076.4	937857.2	316.522		PT365	BLD	668042.2	937720.6	320.353
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PT107	SH	668082.3	937859.3	316.539		PT367	BLD	668035.2	937744.9	319.623
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PT112	SH	668078.7	937870.4	316.547		PT372	BLD	667974.3	937782.4	318.279
PT113	SH	668081.1	937872.7	316.472		PT373	BLD	667968.1	937789.6	318.03
PT114	SH	668081.9	937877.2	316.469		PT374	RD	667966.1	937793.6	317.734
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PT117	EP	668074.3	937876.1	316.594		PT377	SH	667967.3	937798.1	317.599
PT118	TM	668071.8	937879	316.342		PT378	SH	667972.1	937795.5	317.821
PT119	TM	668076.7	937878.8	316.445		PT379	SH	667976.9	937798.1	317.559
PT120	TM	668077.2	937885.8	316.536		PT380	SH	667975.5	937802	317.229
PT121	SH	668079.9	937885	316.362		PT381	SH	667973.8	937805.3	317.111
PT122	SH	668082.8	937883.4	316.48		PT382	SH	667974.4	937809.3	317.087
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PT124	SH	668064.8	937896.9	315.429		PT384	SH	667986.3	937808.3	317.055
PT125	BLD	668064.8	937885.4	315.743		PT385	SH	667989	937806.7	317.471

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PT128	EP	668066.9	937881.4	316.367		PT388	BLD	667996.6	937819.4	317.014
PT129	BLD	668073.2	937873.9	316.28		PT389	BLD	667997.1	937825.8	316.715
PT130	SH	668076.5	937842.5	316.803		PT390	BLD	667997.7	937836.1	316.436
PT131	SH	668080.9	937837.3	316.882		PT391	SH	667999.8	937837.9	316.489
PT132	SH	668076.4	937833.4	317.117		PT392	SH	668004.1	937837	316.697
PT133	SH	668079.1	937829.3	317.088		PT393	SH	668006.3	937835.7	316.836
PT134	SH	668084.6	937829.3	317.095		PT394	SH	668012.2	937839.5	317.101
PT135	SH	668084.6	937825.2	317.166		PT395	BLD	668024	937834.2	316.943
PT136	SH	668080.9	937824.4	317.192		PT396	EP	668028.4	937833.8	316.701
PT137	EP	668075.2	937830.8	317.409		PT397	SH	668027.3	937830.5	316.834
PT138	SH	668076.5	937824.8	317.309		PT398	SH	668024.8	937827.5	316.95
PT139	SH	668080.1	937820.9	317.285		PT399	SH	668027.4	937825.1	316.977
PT140	SH	668083.9	937818.9	317.208		PT400	SH	668025.7	937818	317.088
PT141	SH	668084.3	937814.6	317.38		PT401	BLD	668022.6	937817.1	317.238
PT142	SH	668080.3	937812.9	317.483		PT402	SH	668025.6	937813.3	317.258
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PT144	EP	668075.5	937812.1	317.622		PT404	BLD	668031.1	937802.8	317.66
PT145	CV	668075.9	937810.5	317.869		PT405	SH	668027.5	937801.2	317.556
PT146	CV	668076.6	937810.4	317.877		PT406	SH	668031.4	937799.3	317.671
PT147	CV	668076.1	937808	317.884		PT407	BLD	668035	937801.7	318.075
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PT149	BLD	668073.4	937815.4	317.468		PT409	SH	668031.4	937796	317.74
PT150	BLD	668073.5	937803.4	317.824		PT410	SH	668033.4	937793.9	317.725
PT151	SH	668077.3	937804.7	317.737		PT411	BLD	668035.2	937792.8	317.863
PT152	SH	668080.4	937805.5	317.546		PT412	BLD	668029.7	937792.2	318.048
PT153	SH	668083.8	937807.7	317.514		PT413	BLD	668029.5	937779.7	318.482
PT154	SH	668084	937803.1	317.576		PT414	BLD	668035.6	937839.2	316.76
PT155	SH	668080.5	937801.9	317.645		PT415	BLD	668030	937849.5	316.014
PT156	SH	668076.8	937799.4	318.005		PT416	BLD	668014.7	937849.8	315.771
PT157	SH	668080.5	937797	317.729		PT417	RD	668001.4	937850	315.553
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PT159	SH	668086.6	937795.5	317.625		PT419	BLD	668015.4	937870.2	315.216
PT160	SH	668088.9	937794.7	317.784		PT420	RD	668022.4	937889	314.617
PT161	SH	668087.8	937791.7	318.04		PT421	RD	668020.3	937890.7	314.467
PT162	BLD	668090.2	937790.5	318.057		PT422	BLD	668035.6	937896.8	314.523
PT163	SH	668086	937790	318.019		PT423	CV	668032.5	937898.1	314.441
PT164	SH	668079.9	937790.6	317.829		PT424	CV	668032.1	937898.6	314.354
PT165	SH	668076.8	937791.1	317.997		PT425	EP	668026.8	937902.6	314.367
PT166	EP	668075.9	937791.5	318.028		PT426	EP	668042.4	937923.4	313.423
PT167	SH	668081.3	937788.3	317.911		PT427	EP	668045.7	937913.1	313.825
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PT169	SH	668088.3	937782.1	318.256		PT429	CV	668045.2	937915.7	314.017
PT170	SH	668083.1	937782.1	318.113		PT430	RD	668050.4	937924.9	313.193
PT171	SH	668077.2	937783.1	318.448		PT431	RD	668048	937928.1	313.163
PT172	SH	668077.1	937779.4	318.482		PT432	CL	668049.6	937927.2	313.142
PT173	SH	668080.8	937779.2	318.382		PT433	BLD	668057.8	937924.9	313.443
PT174	SH	668086.1	937777	318.527		PT434	BLD	668139.5	937920.4	313.76
PT175	SH	668088.4	937774.7	318.351		PT435	BD	668156.3	937920.7	312.957
PT176	CV	668076.7	937775.7	318.733		PT436	BLD	668156.4	937893.6	315.143
PT177	CV	668076.4	937775.7	318.755		PT437	BLD	668120.5	937803.6	317.77
PT178	SH	668075.6	937773.1	318.598		PT438	SH	668121.8	937806.3	317.702
PT179	BLD	668073.5	937768.6	318.708		PT439	BLD	668120.3	937810	317.679
PT180	SH	668073.1	937767.9	318.686		PT440	SH	668124.2	937808.2	317.693
PT181	SH	668075.1	937765.4	318.807		PT441	SH	668124.2	937805.5	317.683
PT182	BLD	668076.2	937763	318.99		PT442	SH	668127.7	937808.3	317.623
PT183	SH	668077.8	937762.3	318.92		PT443	SH	668129.9	937805.3	317.555
PT184	SH	668079.4	937758.5	319.226		PT444	SH	668132.3	937808.2	317.557
PT185	SH	668076.9	937758.6	318.98		PT445	SH	668135.2	937805	317.569
PT186	SH	668079.6	937754.5	319.302		PT446	SH	668139.8	937808.7	317.523
PT187	SH	668077.8	937753.6	319.218		PT447	SH	668142.5	937806.5	317.477
PT188	SH	668078.5	937746.8	319.408		PT448	SH	668143.5	937805.6	317.641
PT189	SH	668076.3	937744	319.51		PT449	BLD	668152.8	937810.8	317.334
PT190	SH	668079.7	937740.7	319.611		PT450	BLD	668152.8	937803.9	317.388
PT191	SH	668080.3	937743.2	319.569		PT451	BLD	668120.4	937826.9	317.189
PT192	SH	668078.8	937739.9	319.631		PT452	SH	668123.3	937828	316.989
PT193	SH	668078.8	937737.1	319.719		PT453	SH	668126.8	937828.7	316.943
PT194	SH	668081	937736.3	319.732		PT454	SH	668126.3	937832	316.931
PT195	SH	668078.1	937736.2	319.726		PT455	SH	668123.9	937832.8	316.937
PT196	SH	668074.3	937736.5	319.73		PT456	SH	668121.8	937833.5	316.965
PT197	BLD	668076	937739.9	319.718		PT457	SH	668128	937833	316.904
PT198	SH	668070.5	937735	319.725		PT458	SH	668128.4	937836.4	316.889
PT199	SH	668067.7	937732.6	319.769		PT459	SH	668135.6	937832.3	316.921
PT200	SH	668065.8	937735.6	319.673		PT460	SH	668134.3	937834.4	316.926
PT201	SH	668064.2	937739.6	319.579		PT461	SH	668138.4	937829.2	316.911
PT202	SH	668061	937736.3	319.632		PT462	SH	668141.1	937835.5	316.628
PT203	SH	668060.3	937732.6	319.705		PT463	SH	668120.5	937838.7	317.002
PT204	SH	668057.4	937735.8	319.652		PT464	BLD	668073.3	937862.2	316.453
PT205	SH	668056.3	937739.5	319.449		PT465	SH	668072.4	937859	316.477
PT206	SH	668052.5	937736.1	319.664		PT466	SH	668069.5	937857	316.409
PT207	SH	668050.9	937732.6	319.757		PT467	SH	668065.8	937859.2	316.319
PT208	SH	668048.6	937736.2	319.724		PT468	SH	668064.3	937857.5	316.229
PT209	BLD	668043.3	937739.9	319.659		PT469	SH	668063.9	937853.2	316.483
PT210	BLD	668043.6	937731.8	319.686		PT470	SH	668055.7	937859.2	316.296
PT211	BLD	668075.8	937729.8	319.966		PT471	SH	668050.3	937854.7	316.365

PT212	BLD	668079.9	937728.9	320.175		PT472	BLD	668050.1	937852.9	316.654
PT213	BLD	668079.7	937763.4	318.77		PT473	SH	668056.8	937852.8	316.47
PT214	SH	668080.8	937767.6	318.711		PT474	SH	668063.8	937852.2	316.438
PT215	SH	668083.6	937771.3	318.618		PT475	SH	668067.5	937853.8	316.473
PT216	CV	668088.4	937773.9	318.388		PT476	BLD	668073.3	937851.7	316.674
PT217	CV	668088.4	937774.1	318.401		PT477	BLD	668073.4	937838.8	317.02
PT218	CV	668088.9	937774.3	318.362		PT478	SH	668071.2	937834.5	316.988
PT219	CV	668089.2	937774.2	318.355		PT479	SH	668071.7	937829.5	317.224
PT220	CV	668089.7	937774	318.348		PT480	BLD	668073.4	937827.2	317.205
PT221	CV	668089.7	937773.6	318.358		PT481	SH	668067.6	937828.1	317.111
PT222	SH	668092.5	937776.3	318.551		PT482	SH	668064.6	937832.8	317.034
PT223	SH	668090.5	937779.5	318.338		PT483	SH	668061.8	937837.4	316.978
PT224	SH	668092.9	937780.6	318.233		PT484	SH	668056.2	937836.7	316.98
PT225	SH	668091.7	937784.1	318.136		PT485	SH	668057.4	937831	317.048
PT226	SH	668090.5	937787.6	318.117		PT486	SH	668058.5	937827.6	317.15
PT227	SH	668095.2	937788.3	318.215		PT487	SH	668050.6	937828	316.962
PT228	SH	668098.3	937788.8	318.206		PT488	SH	668049.9	937833.6	316.97
PT229	SH	668098.2	937786.1	318.204		PT489	SH	668049	937837	316.957
PT230	SH	668097.9	937782.4	318.229		PT490	BLD	668043.9	937838	317.267
PT231	SH	668097.4	937777.8	318.321		PT491	BLD	668073.7	937792	318.073
PT232	SH	668097.1	937773.1	318.529		PT492	SH	668073.1	937784.7	318.318
PT233	SH	668100.9	937773.3	318.58		PT493	BD	668073.2	937780.3	318.439
PT234	SH	668102.2	937777.1	318.319		PT494	SH	668069.9	937784.4	318.355
PT235	SH	668101.1	937781.3	318.285		PT495	SH	668064.9	937790.3	318.076
PT236	SH	668100.2	937785.2	318.239		PT496	SH	668062.6	937784.4	318.262
PT237	SH	668102.1	937788.4	318.071		PT497	SH	668061.5	937781.1	318.253
PT238	BLD	668103.3	937790.4	317.873		PT498	SH	668054.5	937781.3	318.237
PT239	SH	668105.1	937786.6	318.137		PT499	SH	668053	937785.2	318.171
PT240	SH	668105.9	937783.1	318.189		PT500	SH	668051.4	937789.3	318.097
PT241	SH	668106.2	937778.4	318.236		PT501	SH	668045	937791.3	318.148
PT242	SH	668106.3	937774.5	318.368		PT502	SH	668044.7	937785.9	318.238
PT243	SH	668106.4	937771.7	318.607		PT503	BD	668043.5	937789.4	318.204
PT244	SH	668109.8	937771.4	318.611		PT504	BD	668046.8	937781.7	318.191
PT245	SH	668114.7	937770.8	318.727		PT505	SH	668050.5	937781.3	318.192
PT246	CV	668118.6	937769.6	318.768		PT506	BLD	668073.6	937768.4	318.52
PT247	CV	668118.6	937769.2	318.875		PT507	SH	668072.8	937765.9	318.772
PT248	BLD	668120.4	937768.5	318.906		PT508	SH	668068.1	937767.9	318.712
PT249	SH	668118	937771.4	318.745		PT509	SH	668064.3	937765.9	318.846
PT250	SH	668114.6	937774.6	318.45		PT510	SH	668061.8	937764.8	318.757
PT251	SH	668112.3	937778.2	318.273		PT511	SH	668059.2	937766.6	318.779
PT252	SH	668116.9	937781	318.219		PT512	SH	668056.8	937767.3	318.813
PT253	SH	668114.7	937784	318.086		PT513	SH	668055.6	937765.9	317.208
PT254	SH	668110.9	937786.4	318.028		PT514	SH	668054.7	937765.1	317.217

PT255	SH	668108.3	937788.8	318.063		PT515	SH	668050.4	937765	317.161
PT256	SH	668106.5	937792.3	317.922		PT516	SH	668048.2	937766.1	317.281
PT257	SH	668104.3	937794.3	317.593		PT517	SH	668047.6	937767.1	318.799
PT258	SH	668106.6	937796.8	317.885		PT518	BLD	668043.7	937764.7	322.083
PT259	SH	668110.6	937794.3	317.866						