CHAPTER FIVE

5.0 COSTING, SUMMARY, RECOMMENDATION AND CONCLUSION.

5.1 Cost Estimation of the Project

The project costing was based on number of variables which includes area to be covered, instruments, personnel, transportation and so on. However, another critical factor to be considered is the time duration in which the project was executed. The table below shows the duration the project was accomplished.

Table 5.1: Scheduled and Duration of the Project Execution

Description	Duration (Days)
Reconnaissance	1
Beaconing / Monumentation	1
Spot height points establishment	1
XYZ acquisition of the spot height points (using TS)	1
Height observation of the spot height points (using level instrument)	1
Detailing (using handheld GPS)	1
Data Downloading / Processing	3

Plotting and Report Writing	7
Submission of Report and Plan	5
Total No. of Days Spent for the Project	**21**

5.1.1 Project Costing Breakdown

Costing of this project was based on Professional Scale of Fees as approved by Nigerian Institution of Surveyor (NIS) in 2017 using 1996 Federal Government Approved Scale of Fees for Consultants in the Construction Industry. The prevailing inflation rate as at February 2023 was 21.91 % and this was applied to the cost estimate.

Table 5.2: Worked out Calculation for the grand Total Cost

S/N	OPERATION	RATE/DAY	NO OF DAYS	UNIT COST (#)	AMOUNT (#)
1	**RECONNISSANCE(1 DAY)**				
	4 Technician	15,189.11	1	15,189.11 x 4	60,756.40
	1 Skilled Labour	9,468.61	1	9,468.61x 1	9,468.61

	Transportation (Field vehicle + Driver / Mechanic + fuel	46,027.61	1	46,027.61 x 1	46,027.61
	Basic equipment (Hand held GPS etc.)	46,027.61	1	46,027.61 x 1	46,027.61
	SUB TOTAL				**157,546.00**
2	**(A) BEACONS** (5) (standard Cadastral Beacon)	5,000 per Beacon		5,000 x 5	25,000.00
	(B) BEACONING/ MONUMENTATION (1 day)				
	6 Surveyors	15,189.11	1	6x 15,189.11x 1	91,134.11
	3 Skilled Labour	9,468.61	1	3x 9,468.61x 1	28,405.83
	Transportation (Field vehicle + Driver / Mechanic + fuel)	46,027.61	1	46,027.61 x 1	46,027.61

	Basic tools (Crow bar, Trowel, Shovel etc)	13,929.00	1	13,929.00x 1	13,929.00
	SUBTOTAL				**179,496.55**
3	**Spot Height Establishment (1 DAY)**				
	2 surveyors	15,189.11	1	2x15,189.11 x 1	30,378.22
	3 Unskilled Labour	9,468.61	1	3 x9,468.61x 1	56,811.66
	Basic Equipment	46,027.61	1	46,027.61x1	92,055.22
	Transportation (Field vehicle + Driver / Maintenance + Fuel)	46,027.61	1	46,027.61 x 1	92,055.22
	SUBTOTAL				**271,300.32**
4	**XYZ ACQUISITION USING (TS)**				

	(1 DAY)				
	1 Senior Surveyor	22,783.67	1	1x 22,783.67 x 2	45,567.34
	2 Surveyors	15,189.11	1	2 x15,189.11 x 2	60,756.44
	2skilled Labour	9,468.61	1	2 x9,468.61x 2	37,874.44
	Basic Equipment	46,027.61	1	46,027.61x 2	92,055.22
	Transportation (Field vehicle + Driver / Maintenance + Fuel)	46,027.61		46,027.61 x 2	92,055.22
	SUBTOTAL				**328,308.66**
5	**HEIGHT OBSERVATIION (LEVEL INSTRUMENT) (1DAY)**				
	1 Senior Surveyor	22,783.67	1	1x 22,783.67 x 2	45,567.34

	2 surveyors	15,189.11	1	2 x15,189.11 x 2	60,756.44
	2skilled Labour	9,468.61	1	2 x9,468.61x 2	37,874.44
	Basic Equipment	46,027.61	1	46,027.61x 2	92,055.22
	Transportation (Field vehicle + Driver / Maintenance + Fuel)	46,027.61	1	46,027.61 x 2	92,055.22
	SUBTOTAL				**328,308.32**
6	**DETAILING (1 DAY)**				
	2 Surveyors	15,189.11	1	2x 15,189.11x 1	30,378.22
	3 Skilled Labour	9,468.61	1	3x 9,468.61x 1	28,405.83
	Transportation (Field vehicle + Driver / Mechanic + fuel)	46,027.61	1	46,027.61 x 1	46,027.61

	Basic Equipment	46,027.61	1	46,027.61x 1	46,027.61
	SUBTOTAL				**150,839.27**
7	**DATA DOWNLOADING / PROCESSING (3 DAYS)**				
	1 Senior Surveyor	22,783.67	3	22,783.67 x 3	68,351.01
	2 surveyors	15,189.11	3	2x15,189.11 x 3	91,134.66
	Computer Accessories	49,315.28	3	49,315.28 x 3	147,945.84
	SUBTOTAL				**307,431.51**
8	**PLOTTING AND REPORT WRITTING (7 DAYS)**				
	1 Senior Surveyor	22,783.67	7	1x22783.67 x 7	159,485.69

	2 surveyors	15,189.11	7	2x15,189.11 x 7	212,647.54
	Standard set (computer, plotter etc)	65,753.70	7	1x65,753.70 x 7	460,275.90
	SUBTOTAL				**832,409.13**
9	**SUBMISSION OF REPORT AND PLAN (1 DAY)**				
	1 Chief Surveyor	30,800.00	1	30,800.00x 1	30,800.00
	2 surveyors	15,189.11	1	2x 15,189.11x 1	30,378.22
	1 Computer	46,027.61	1	46,027.61 x 1	46,027.61
	Consumables	13,929.00	1	13,929.00 x 1	13,929.00
	SUBTOTAL				**121,135.41**

COST OF TH]E PROJECT =	**2,676,775.17**
ACCOMODATION(15% of the cost of the project)	595,177.22
MOBILIZATION/DEMOBILIZATION (10% of cost of the project) =	396,784.81
CONTINGENCIES (5% of cost of the project) =	198,392.41
VAT (7.5% of the Total cost of the project)=	297,588.61
ACTUAL BILL/ GRAND TOTAL =	**4,164,718.22**

Hence, the total cost of expenditure used for comparative evaluation of digital levelling and total station equipment for height measurement project was estimated to be Four Million, One Hundred and Sixty Four Thousand, Seven Hundred Eighteen Naira, Twenty Two Kobo only.

5.2 Summary

The comparative evaluation of digital levelling and total station equipment for height measurement demonstrates that both tools can achieve high accuracy and reliability, but with different characteristics. Digital levelling excels in precise levelling tasks, offering high precision and accuracy, whereas total station equipment provides a broader range of applications, including topographic surveys and construction layout. The project emphasizes the need for surveying professionals to understand the capabilities and limitations of each tool, ensuring that the most suitable equipment is selected for specific projects. The results of this

research contribute to the advancement of surveying practices, enhancing the accuracy and reliability of height measurements.

5.3 Recommendation

This project recommends that surveying professionals and organizations establish standardized procedures for the calibration, maintenance, and operation of digital levelling and total station equipment. By following standardized procedures, professionals can ensure that equipment is properly maintained and operated, guaranteeing accuracy and reliability. Furthermore, it is recommended that professionals document their procedures and results, to facilitate the development of best practices and guidelines for surveying.

5.4 Conclusion

This comparative evaluation has demonstrated that digital leveling and total station equipment are both reliable tools for height measurement, each with its own advantages and disadvantages. In conclusion, the choice between these two tools depends on the specific requirements of the project, including the range, precision, and type of measurement. By selecting the most suitable equipment, surveying professionals can ensure the accuracy and reliability of height measurements, ultimately contributing to the success of their projects. This project's findings have significant implications for the development of more effective surveying methodologies and the advancement of surveying practices, highlighting the importance of understanding the capabilities and limitations of digital leveling and total station equipment.

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APPENDIX

ID	EASTING	NORTHING	TS HEIGHT	LEVEL HEIGHT
PL.1	680428.567	946558.865	356.128	
PL.2	680417.004	946286.792	354.746	
PL.3	680171.885	946294.956	353.013	
PL.4	680205.833	946686.334	357.652	
PL.5	680380.567	946678.865	356.849	
SH1	680272.275	946497.781	355.749	355.715
SH2	680267.717	946479.907	356.403	356.362
SH3	680273.327	946450.469	354.811	354.772
SH4	680287.358	946434.349	354.268	354.208
SH5	680317.873	946433.648	355.036	354.984
SH6	680304.544	946455.727	355.710	355.668
SH7	680337.867	946463.436	355.448	355.386
SH8	680342.774	946441.708	356.295	356.240
SH9	680342.774	946441.708	356.736	356.680
SH10	680348.740	946443.460	355.971	355.931

SH11	680377.262	946451.836	355.725	355.673
SH12	680382.060	946482.711	355.318	355.277
SH13	680381.009	946518.108	354.819	354.766
SH14	680350.494	946509.345	355.174	355.128
SH15	680356.104	946484.813	355.033	355.005
SH16	680332.603	946480.960	355.228	355.188
SH17	680298.581	946490.422	355.834	355.802
SH18	680318.222	946506.191	355.726	355.678
SH19	680308.753	946526.168	356.148	356.096
SH20	680342.774	946441.708	356.736	356.680

SHOPRITE	680275.567	946584.865	,	S.G.I	680364.567	946630.865
SHOPRITE	680229.567	946585.865	,	S.G.I	680368.567	946658.865
SHOPRITE	680218.567	946585.865	,	S.G.I	680360.567	946661.865
SHOPRITE	680214.567	946661.865	,	S.G.I	680347.567	946661.865
SHOPRITE	680262.006	946660.833	,	S.G.I	680346.567	946659.865
SHOPRITE	680264.633	946610.907	,	S.G.I	680348.567	946639.865

SHOPRITE 680269.493 946616.306 , S.G.I 680348.567 946630.865

SHOPRITE 680281.021 946610.551 , S.G.I 680364.567 946630.865

SHOPRITE 680281.021 946610.551

DRCT. IES 680344.567 946584.865 , BLD&QS 680371.567 946581.865

DRCT. IES 680343.551 946601.098 , BLD&QS 680370.514 946603.802

DRCT. IES 680352.430 946601.591 , BLD&QS 680401.497 946607.815

DRCT. IES 680352.329 946603.210 , BLD&QS 680404.537 946602.905

DRCT. IES 680361.208 946603.703 , BLD&QS 680402.499 946585.830

ARC&URP 680328.567 946604.865 , BFM 680262.567 946521.871

ARC&URP 680292.567 946602.865 , BFM 680267.567 946509.867

ARC&URP 680293.684 946585.013 , BFM 680279.567 946513.862

ARC&URP 680329.684 946587.013 , BFM 680274.567 946525.865

MKT. 680215.442 946426.097 , ACCT.680262.660 946428.209

MKT. 680214.930 946436.134 , ACCT.680218.483 946419.645

MKT. 680263.075 946445.466 , ACCT.680218.891 946411.655

MKT. 680263.587 946435.430 , ACCT.680263.068 946420.219

PHYS. 680266.105 946405.563 , OTM. 680266.988 946386.384

PHYS. 680267.046 946394.755 , OTM. 680218.393 946380.018

PHYS. 680218.331 946387.08 , OTM. 680221.571 946372.409

PHYS. 680217.389 946397.897 , OTM. 680270.166 946378.775

PAD. 680240.402 946321.660

PAD. 680215.235 946320.874

PAD. 680218.077 946335.465

PAD. 680243.244 946336.252