



# ETHEKWINI MUNICIPALITY HOUSING TYPOLOGIES STUDY PILOT PROJECT OVERVIEW



PRESENTATION 2/5

# PROJECT OVERVIEW

# INTRODUCTION AND BACKGROUND

## 1 INTRODUCTION

- THIS PROJECT HAS BEEN INITIATED BY THE ARCHITECTURE DEPARTMENT OF THE ETHEKWINI MUNICIPALITY TO DEVELOP HOUSING TYPOLOGIES FOR THE DELIVERE OF NEW PROJETS AND EXISTING SETTLEMENT UPGRADE PROJECTS IN THE ETHEKWINI MUNICIPAL REGION
- THE STUDY IS TO INTEGRATE TOWN PLANNING, URBAN DESIGN AND ARCHITECTURE COMPONENTS
- THE INTENTION IS TO IDENTIFY PRACTICES WHICH OPTIMISE BOTH THE QUALITY AND SUSTAINABILITY OF RESULTANT LIVING ENVIRONMENTS

## 2 BACKGROUND

- DESPITE THE DELIVERY OF ALMOST 2 MILL HOUSING UNITS BY GOVERNMENT SINCE 1994, THE DOMINANT HOUSING TYPOLOGY CONTINUES TO BE DETACHED, SINGLE FAMILY HOMES ON LARGER FREE HOLD PLOTS
- THE INCREASING PRESSURE ON URBAN LAND, DEMANDS FOR OPTIMISING EXISTING SERVICE INFRASTRUCTURE AND THE NEGATIVE SOCIO-ECONOMIC IMPLICATIONS OF DEVELOPING ON THE URBAN PERIPHERY HAVE NECESSITATED A REVIEW OF THE LOCATION AND DESIRED DENSITIES OF HOUSING SETTLEMENTS
- IT HAS BECOME NECESSARY THAT THE SUPPLY OF HOUSING BE MORE RECEPTIVE TO THE REDEVELOPMENT OF SITES LOCATED WITHIN ALREADY SERVICED AND DEVELOPED AREAS AS WELL AS THE UPGRADING OF EXISTING SETTLEMENTS
- A STUDY AND DEVELOPMENT OF AFFORDABLE HOUSING TYPOLOGIES APPLICABLE TO PREVAILING LOCAL CONDITIONS (TYPOGRAPHY, CLIMATE, TECHNOLOGIES AND FINANCE) WILL ASSIST IN MEETING THE URBAN HOUSING CHALLENGE WITH GREATER AUTHORITY, EFFICIENCY AND UNDERSTANDING

## 3 PROJECT OBJECTIVES

- TO INFORM THE OPTIMISATION OF QUALITY AND SUSTAINABILITY IN THE DESIGN AND ONGOING DELIVERY OF SUBSIDY HOUSING
- TO DETERMINE OPTIMAL HOUSING TYPOLOGIES FOR APPLICATION IN INFORMAL SETTLEMENT UPGRADING AND GREENFIELD PROJECTS WITHIN THE URBAN AREA OF ETHEKWINI

## 4 DEFINING HOUSING TYPOLOGY

- HOUSING TYPOLOGY ENCOMPASSES ATTRIBUTES OF FUNCTION AND CONFIGURATION CHARACTERISTICS OF PUBLIC AND PRIVATE BUILDINGS AND THE SPACES AROUND THESE BUILDINGS THROUGH CONSTRUCTION
- TYPOLOGY MUST CONSIDER ASPECTS OF TOWN PLANNING AND URBAN DESIGN AS WELL AS THE DETAIL OF MULTI-UNITS OR RESIDENTIAL CLUSTERS
- TYPOLOGY HAS A TIME DIMENSION AND THEREFORE MUST CONSIDER FLEXIBILITY, ADAPTABILITY AND TRANSFORMATION OVER TIME
- THE QUALITY OF HOUSING TYPOLOGY MUST CONSIDER CONTEXT WHICH IS DEPENDANT ON A NUMBER OF FACTORS INCLUDING THE LOCATION OF SERVICES, THE BALANCE BETWEEN PRIVATE, SEMI PRIVATE, COMMUNAL AND PUBLIC SPACE, THE MIX OF RESIDENTIAL AND NON-RESIDENTIAL USE AND THE END-USERS SOCIAL AND CULTURAL STRUCTURES
- IN ETHEKWINI THE CONSIDERATION OF TYPOLOGY IN RELATION TO TOPGRAPHY IS CRITICAL AS MANY INFORMAL SETTLEMENTS ARE FOUNDED ON STEEP AND UNSTABLE LAND. STEEP SLOPES IMPOSE HIGHER BUILDING AND INFRASTRUCTURE COSTS AND CREATE DIFFICULTIES OF ACCESS REQUIRING GREATER CARE IN THE DESIGN AND LAYOUT OF HOUSES

# PROJECT STRUCTURE

- 1 PRECEDENTS AND LITERATURE OVERVIEW
- 2 PILOT PROJECT OVERVIEW**
- 3 BUILDING THE PRINCIPLES
- 4 MATRIX OF TYPOLOGIES
- 5 DESIGN CONSIDERATIONS

# PROJECT STRUCTURE

## 1 PRECEDENTS AND BIBLIOGRAPHY

- KEY ISSUES TO INFORM THE BRIEF
- BIBLIOGRAPHY AND SYNOPSIS OF RELEVANT LITERATURE
- REVIEW OF CASE STUDIES
- FINDINGS TO OFF SET NEGATIVE TRENDS

## 2 PILOT PROJECT OVERVIEW

- AREA / INFRASTRUCTURE AUDIT
- SITE ANALYSIS
- READINESS FOR DEVELOPMENT AND IMPLICATIONS FOR TYPOLOGY SELECTION

## 3 BUILDING THE PRINCIPLES

- GUIDING PRINCIPLES FOR HOUSE DESIGN AND URBAN LAYOUTS

## 4 MATRIX OF TYPOLOGIES

- SUMMARY OF HOUSING TYPOLOGIES
- FINAL HOUSING TYPOLOGY DESIGNS
- COSTINGS

## 5 DESIGN CONSIDERATIONS

- DENSITY AND TOPOGRAPHICAL CONSIDERATIONS
- MATERIALS AND MINIMUM QUALITY LEVEL CONSIDERATIONS
- SERVICING AND SUSTAINABILITY CONSIDERATIONS

# PILOT PROJECT OVERVIEW

# CONTENTS

## 1 SITE OVERVIEW

IN WHICH AN OVERVIEW OF 4 PRE-SELECTED PILOT SITES IS UNDERTAKEN TO ESTABLISH THEIR SUITABILITY FOR IN-SITU UPGRADING.

THE SITES ARE:

- 1 GUMTREE (KENVILLE)
- 2 JADHU'S PLACE
- 3 BANANA CITY
- 4 PILGRIMS X

## 2 DENSITY AND TOPOGRAPHY ANALYSIS

IN WHICH

- CURRENT DENSITIES ON VARIOUS SLOPE CATEGORIES ARE ESTABLISHED,
- SHORTFALLS ARE IDENTIFIED IF ALL EXISTING RESIDENTS ARE TO BE ACCOMMODATED IN FUTURE UPGRADES USING CONVENTIONAL HOUSE TYPOLOGIES AND
- THE CASE IS MADE FOR INCREASING DENSITIES BY USING ALTERNATIVE HOUSE TYPOLOGIES AND DEVELOPING ON CONVENTIONALLY UNDEVELOPABLE SLOPES.

*ALL BASE INFORMATION ON THE PILOT SITES IS TAKEN FROM THE 'PRELIMINARY TECHNICAL PREFEASIBILITY STUDIES ON THE UPGRADING OF INFORMAL SETTLEMENTS' REPORTS BY ANTON AIELLO CONSULTANCY ON BEHALF OF THE PROJECT PREPARATION TRUST (PPT) OF KWAZULU NATAL.*



# SYNOPSIS

THE FOLLOWING CHAPTER ASSESSES THE PILOT SITES IN TERMS OF THEIR CURRENT DENSITIES, TOPOGRAPHY AND FUTURE DEVELOPMENT POTENTIAL.

IF THE GOAL IN FORMALISING THE EXISTING SETTLEMENTS IS TO ACCOMMODATE THE MAJORITY OF EXISTING RESIDENTS ON EACH SITE, IT BECOMES APPARENT THAT STANDARD HOUSING TYPOLOGIES AND LAYOUTS, APPLIED TO THE DEVELOPABLE AREAS (FLAT, MODERATE AND GENTLE SLOPES), WILL NOT ACHIEVE THE REQUIRED DENSITIES.

IT IS CLEAR THEN THAT THE SOLUTION IS TO INCREASE DENSITIES BUT ALSO TO USE THE STEEP AND VERY STEEP SLOPES FOR DEVELOPMENT PURPOSES.

ELSEWHERE IN THE WORLD THIS SHORTFALL HAS BEEN OVERCOME BY UTILISING HIGH RISE DEVELOPMENTS PARTICULARLY ON STEEP SLOPES. THIS IS PROBABLY NOT APPROPRIATE IN ETHEKWINI BECAUSE OF COST, ASSOCIATED POOR URBAN ENVIRONMENTS AND SOCIAL CONDITIONS, THE FACT THAT THEY DO NOT QUALIFY FOR HOUSING SUBSIDIES AND ARE DIFFICULT TO ADMINISTER FROM A SECTIONAL TITLE AND MANAGEMENT POINT OF VIEW.

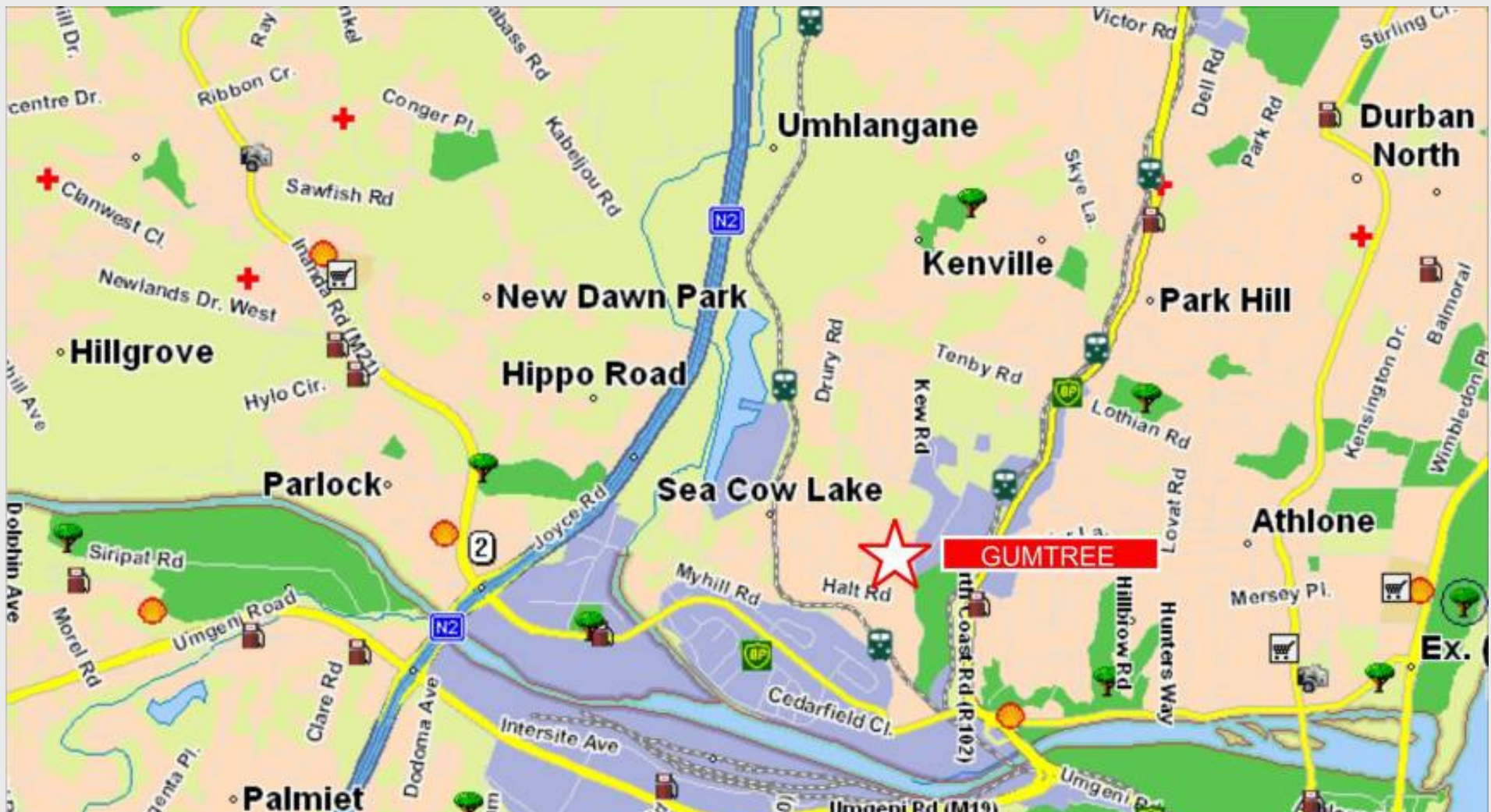
AN APPROPRIATE SOLUTION TO THIS COULD THEREFORE BE SOUGHT IN EMULATING THE EXISTING TYPOLOGIES AND URBAN LAYOUTS WHICH HAVE BEEN DEVELOPED INFORMALLY ON THE PILOT SITES WHERE HIGH-DENSITY, LOW-RISE UNITS HAVE BEEN SELF-BUILT IN PEDESTRIAN DOMINATED ENVIRONMENTS.



# GUMTREE (KENVILLE) OVERVIEW



# GUMTREE - LOCALITY



## GUMTREE:

- IS 7.95HA IN EXTENT,
- IS ZONED FOR SPECIAL RESIDENTIAL 650,
- COMPRISES 17 FORMAL ERVEN (16 IN PRIVATE OWNERSHIP, 1 IN GOVERNMENT OWNERSHIP); AND
- CONTAINS 402 SHACKS (2005).

IT IS ACCESSIBLE FROM THE N2 HIGHWAY AND OTHER MAJOR ARTERIAL ROUTES AND IS CLOSE TO THE UMGENI BUSINESS PARK AND BRIARDENE INDUSTRIAL AREA.



# GUMTREE - AERIAL PHOTO

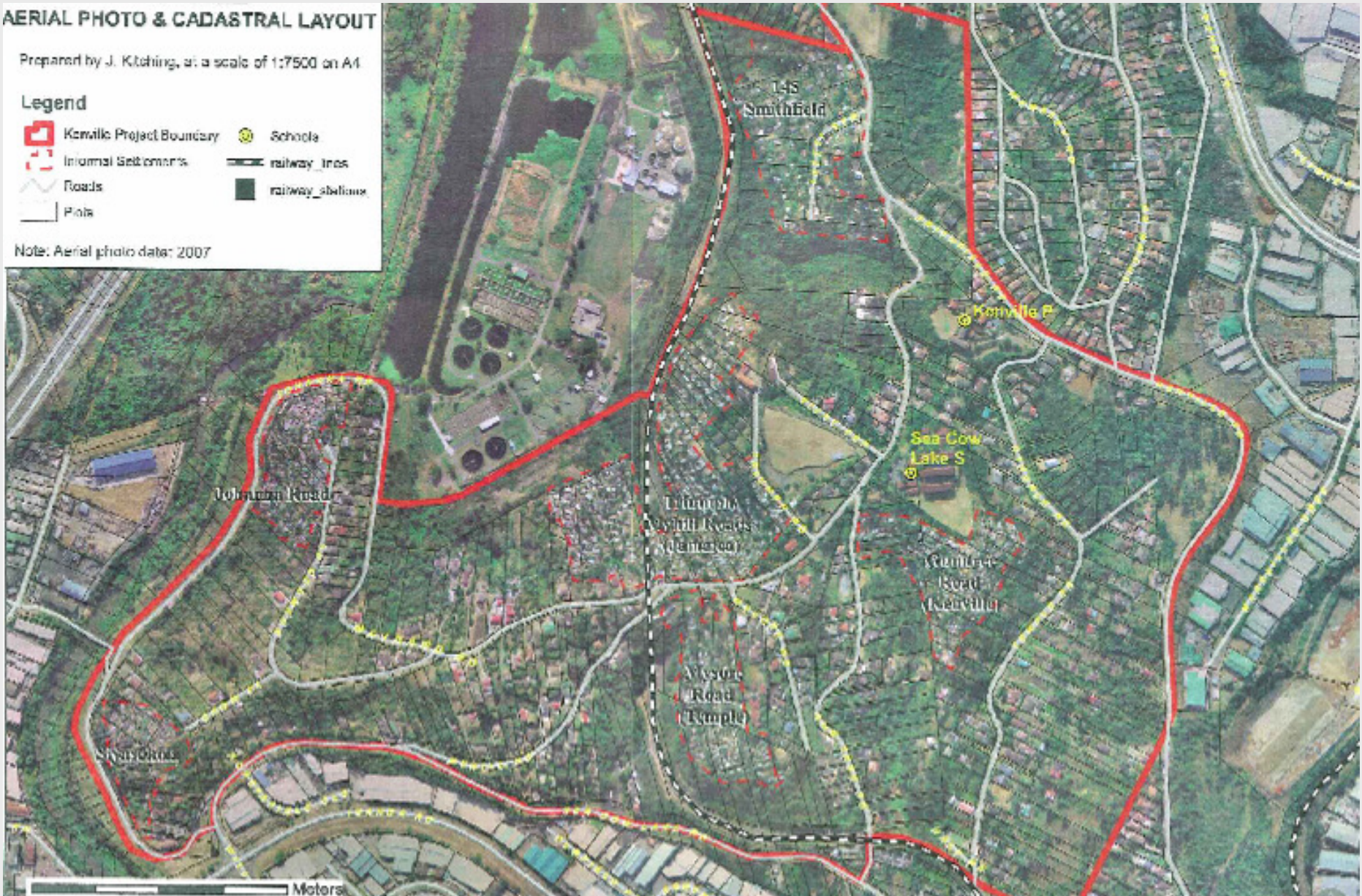
## AERIAL PHOTO & CADASTRAL LAYOUT

Prepared by J. Kitching, at a scale of 1:7500 on A4

### Legend

-  Kenville Project Boundary
-  Informal Settlements
-  Roads
-  Plots
-  Schools
-  railway lines
-  railway stations

Note: Aerial photo data: 2007



**GUMTREE IS CLOSE TO ESTABLISHED SUBURBIA, INDUSTRIAL AREAS AS WELL AS A NUMBER OF OTHER INFORMAL SETTLEMENTS.**



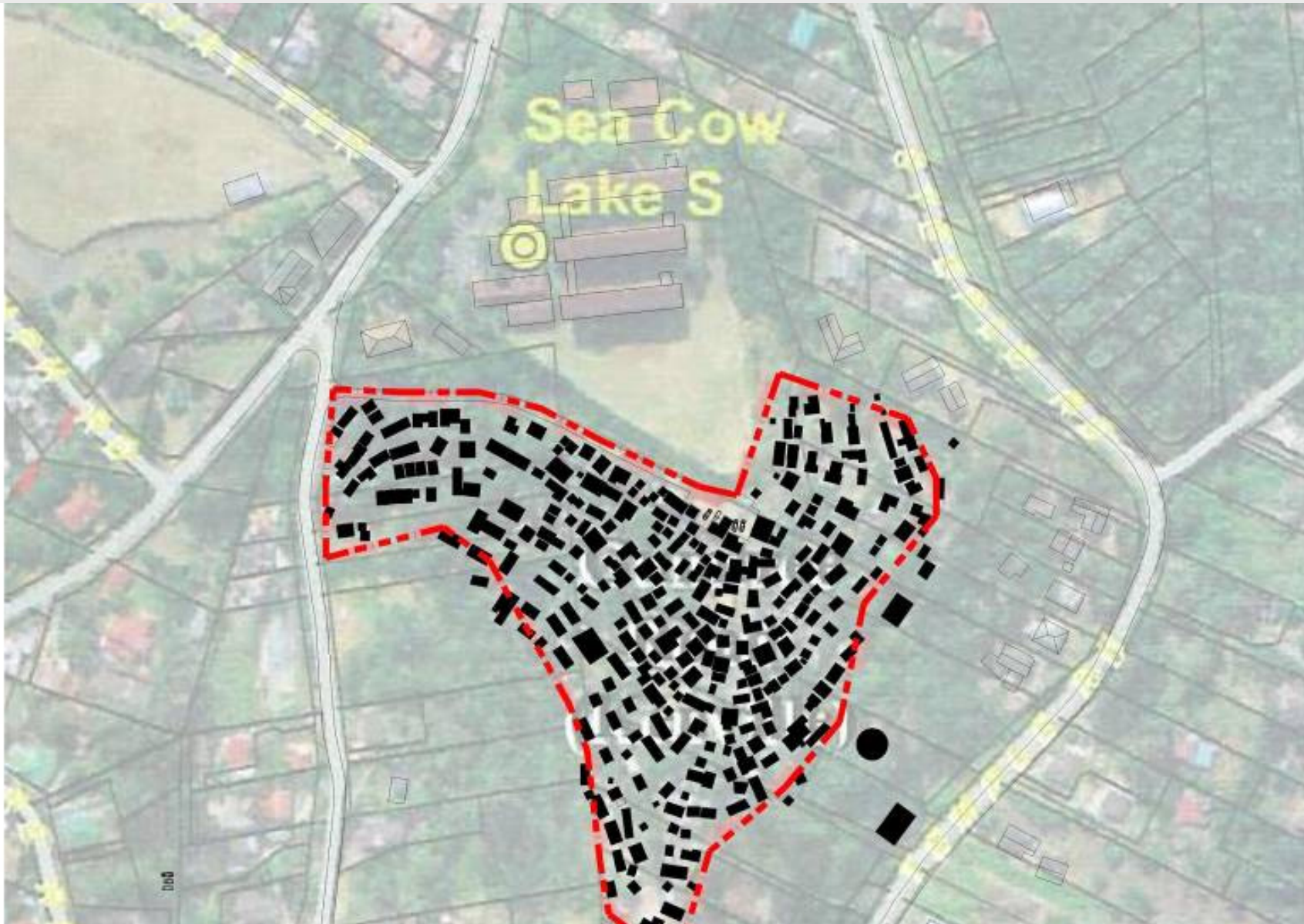
# GUMTREE - SITE PHOTOS



**THE STEEPNESS OF THE SLOPES CLEARLY INDICATE THE DIFFICULTY THAT WOULD BE ENCOUNTERED IN SERVICING THE SITE.**



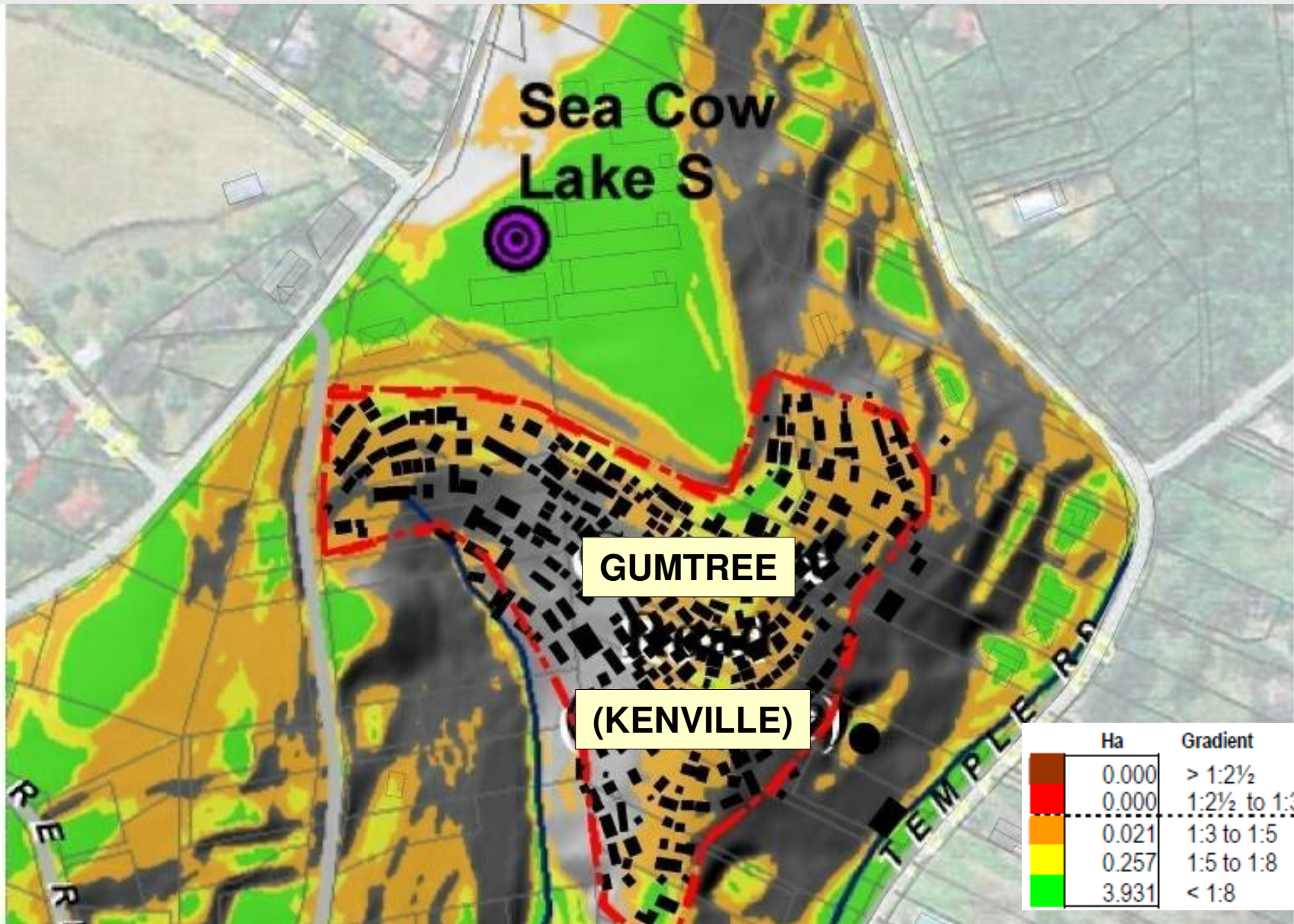
## GUMTREE – EXISTING LAYOUT



THE LAYOUT IS PEDESTRIAN BASED WITH HOUSE POSITIONS BEING DETERMINED IN RESPONSE TO CONTOUR LINES. THE ELONGATED 'ROW-OF-ROOMS' HOUSE TYPOLOGY IS ALSO APPARENT.



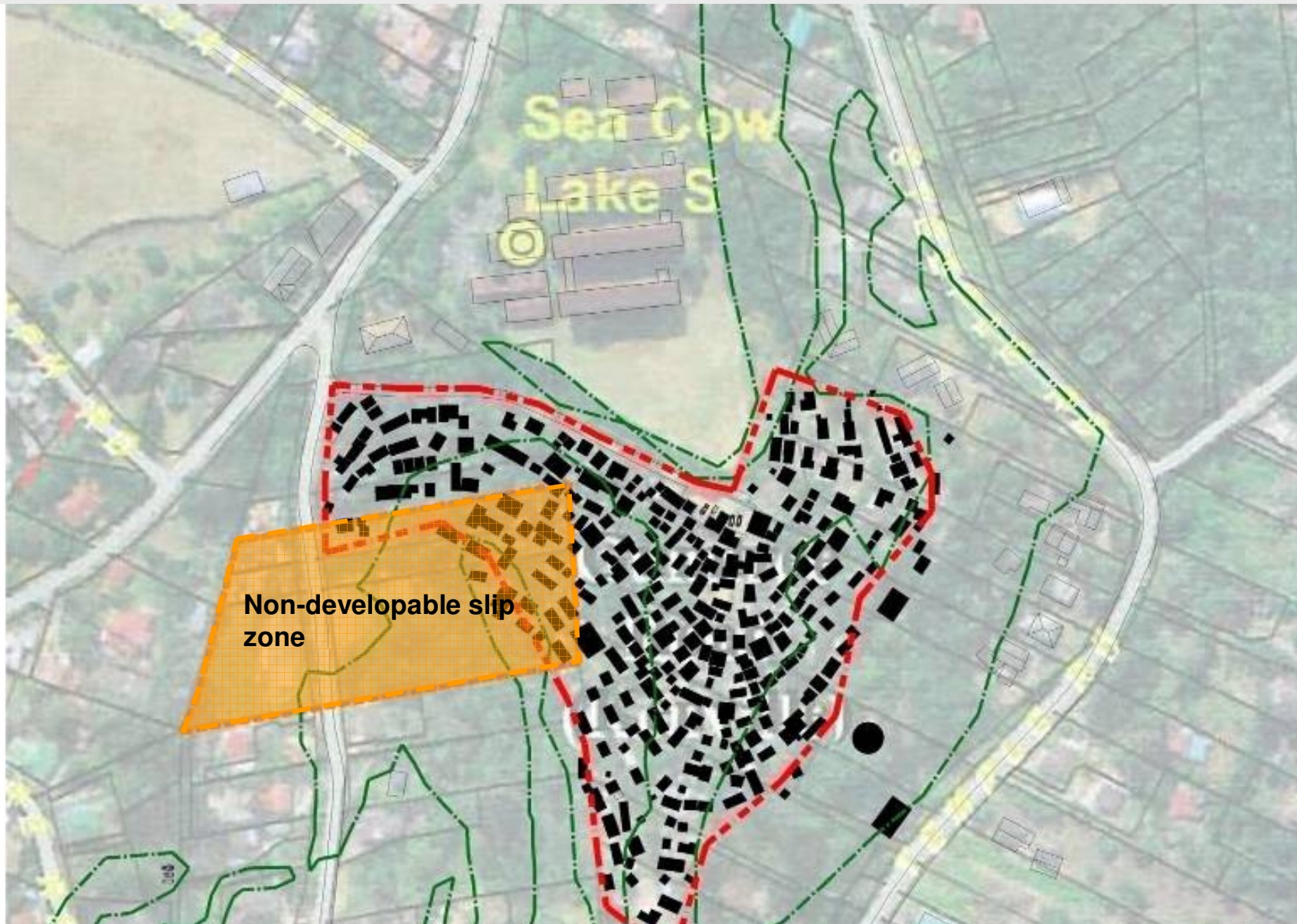
# GUMTREE – SLOPE ANALYSIS



ALTHOUGH THE SITE'S TOPOGRAPHY VARIES, MANY UNITS HAVE BEEN CONSTRUCTED ON STEEP SLOPES AND OTHERS ON A DEMARCATED SLIP SITE.



# GUMTREE - DEVELOPABLE AREA



**IF STANDARD LOW-INCOME HOUSING TYPOLOGIES WERE TO BE DEVELOPED ON THE SITE, DENSITIES WOULD BE CONSIDERABLY REDUCED AS THEY ARE POORLY SUITED TO USE ON STEEP AND VERY STEEP SLOPES .**

# JADHU'S PLACE OVERVIEW



## JADHU'S PLACE - LOCALITY



### JADHU'S PLACE:

- IS 5.97HA IN EXTENT,
- IS ZONED FOR SPECIAL RESIDENTIAL 650 AND PUBLIC OPEN SPACE,
- COMPRISES 20 FORMAL ERVEN, THE MAJORITY OF WHICH ARE IN PRIVATE OWNERSHIP; AND
- CONTAINS 362 HOUSEHOLDS.

JADHU'S PLACE IS ACCESSIBLE FROM THE N2 HIGHWAY AND OTHER MAJOR ARTERIAL ROUTES AND IS SITUATED CLOSE TO THE UMGENI BUSINESS PARK



# JADHU'S PLACE - AERIAL PHOTO



**JADHU'S PLACE IS SITUATED ON LAND CONSIDERED TO BE UNSUITABLE FOR CONVENTIONAL DEVELOPMENT BECAUSE OF ITS STEEP SLOPES. IT IS ALSO TUCKED INTO A POCKET OF LAND WITHIN AN ESTABLISHED SUBURBAN NEIGHBOURHOOD.**



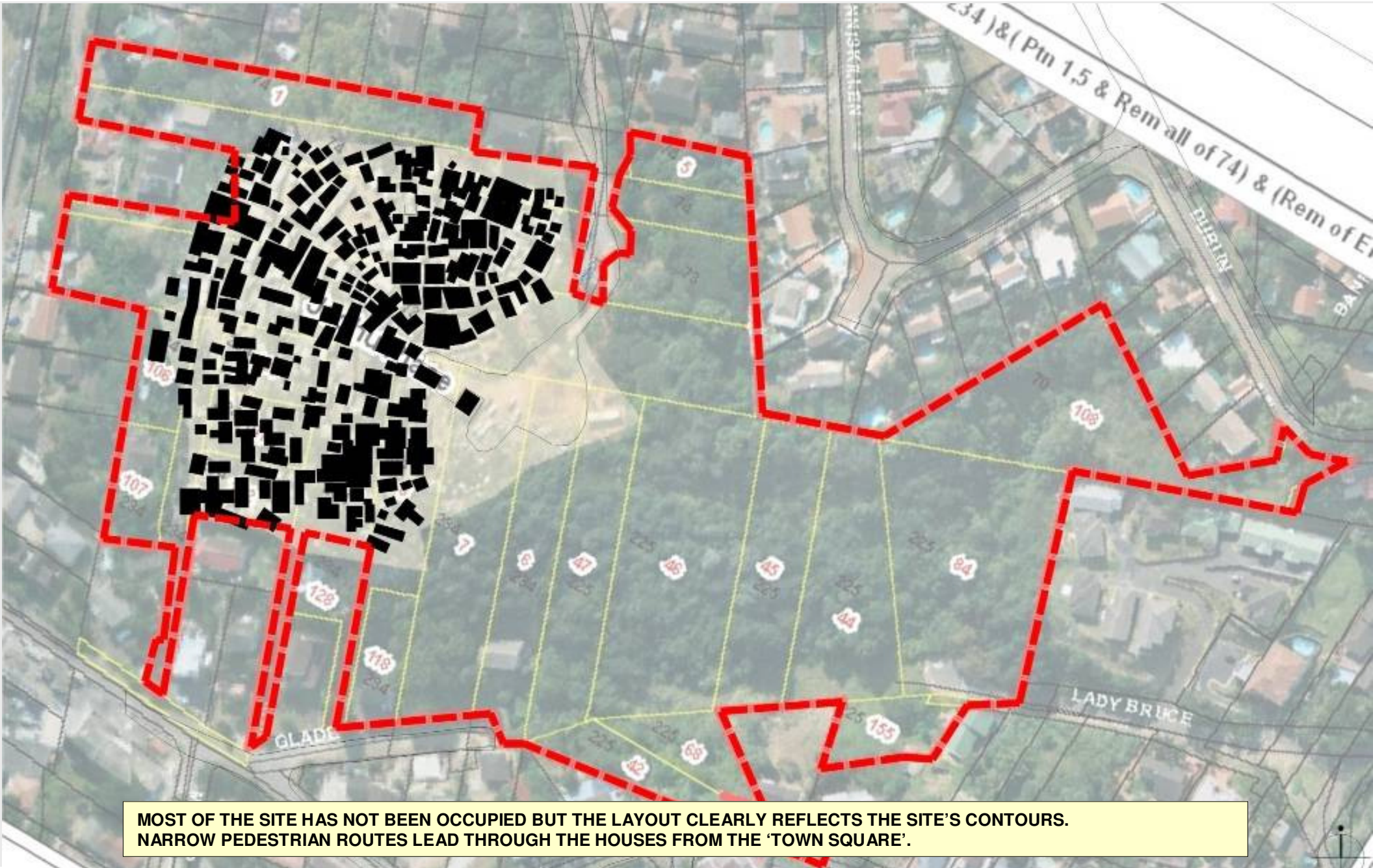
## JADHU'S PLACE - SITE PHOTOS



**THE HOUSING IS DENSELY PACKED TOGETHER DUE TO THE SHORTAGE OF SPACE. THE HOUSING IS ARRANGED AROUND A CENTRAL 'SQUARE' AT THE END OF THE ONLY FORMAL ROAD TO THE SITE AND CONTAINS A TAXI PICKUP POINT, TEMPORARY LATRINES, WATER STAND POINTS ETC. TEMPORARY HOUSING ERECTED TO REPLECEE FLOOD DAMAGED HOUSES CAN ALSO BE SEEN.**



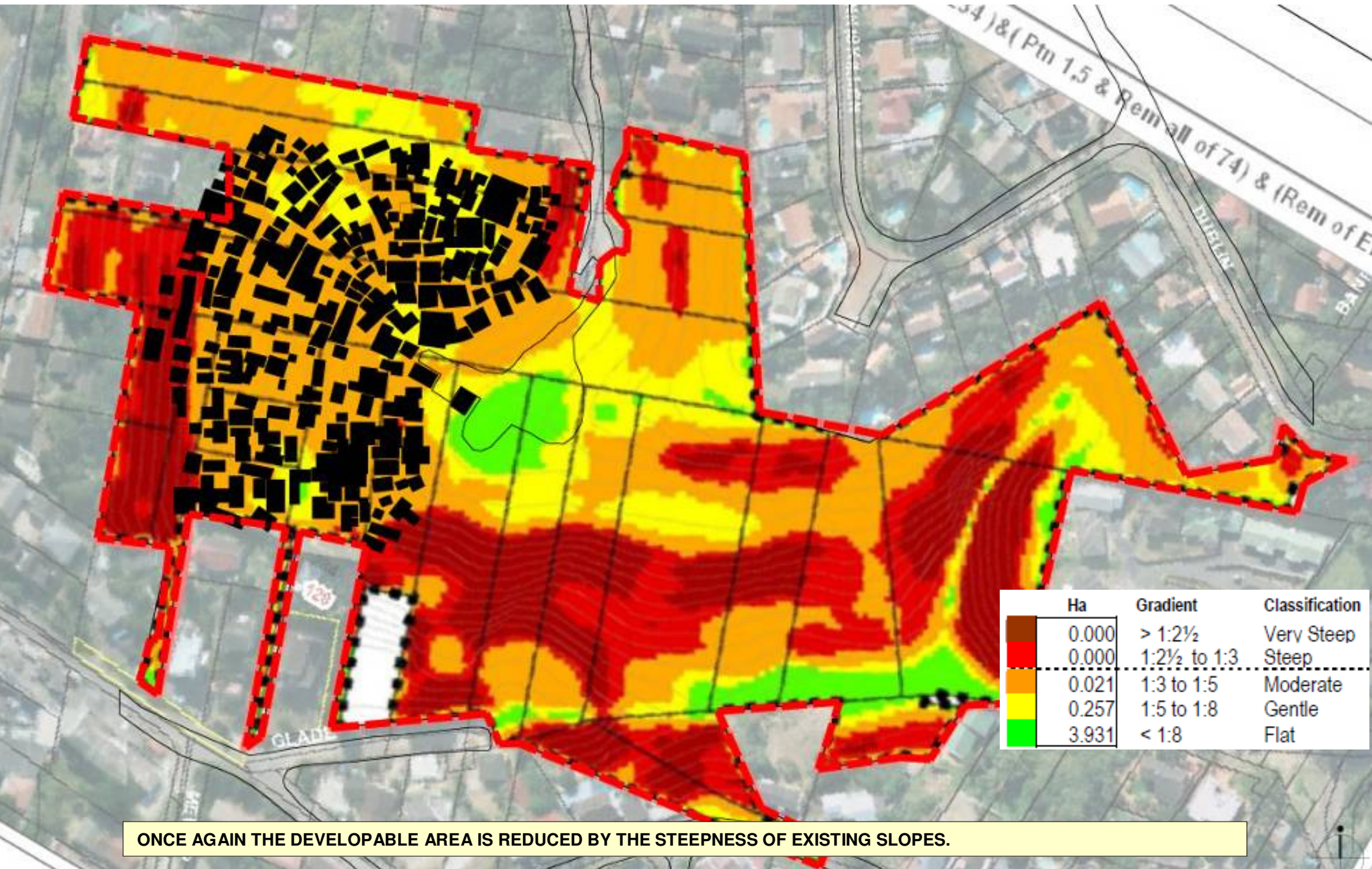
# JADHU'S PLACE - EXISTING LAYOUT



**MOST OF THE SITE HAS NOT BEEN OCCUPIED BUT THE LAYOUT CLEARLY REFLECTS THE SITE'S CONTOURS. NARROW PEDESTRIAN ROUTES LEAD THROUGH THE HOUSES FROM THE 'TOWN SQUARE'.**

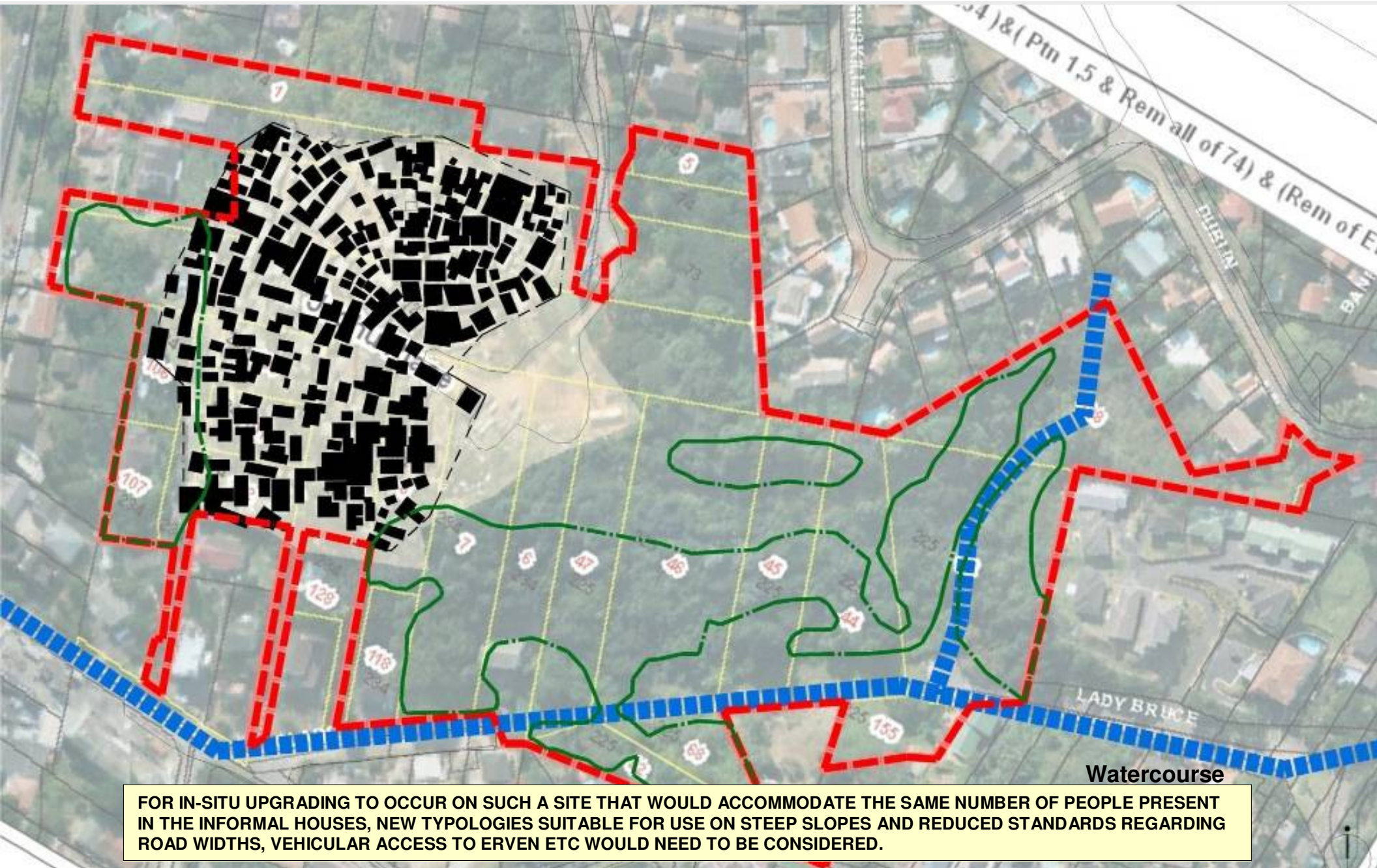


# JADHU'S PLACE – SLOPE ANALYSIS





# JADHU'S PLACE - DEVELOPABLE AREA





# BANANA CITY OVERVIEW

# BANANA CITY - LOCALITY

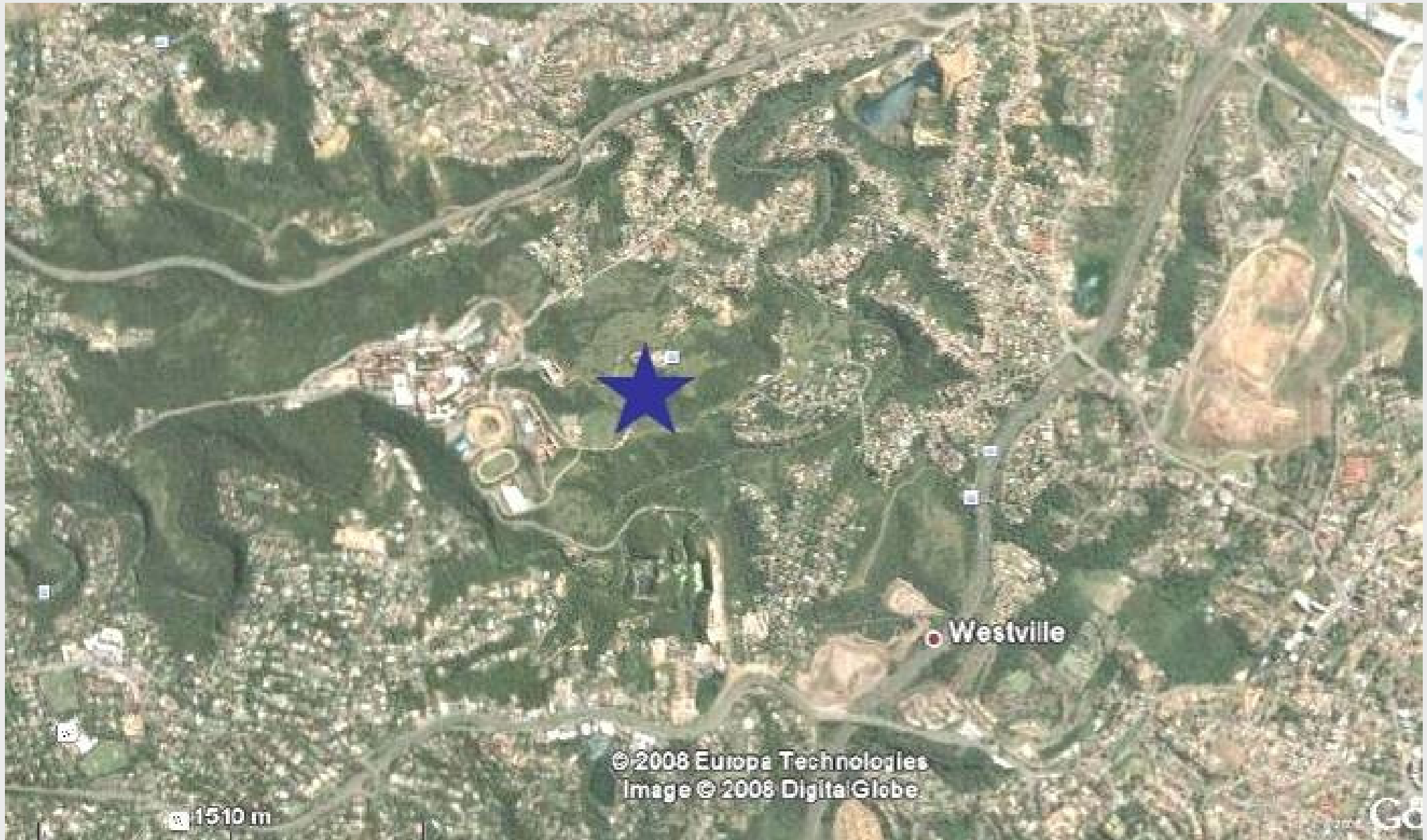


## BANANA CITY:

- IS 12.45HA IN EXTENT,
- IS ZONED FOR EDUCATION AND PUBLIC ASSEMBLY,
- COMPRISES 7 FORMAL ERVEN; AND
- CONTAINS 220 HOUSEHOLDS (614 RESIDENTS).

BANANA CITY IS LOCATED ON TWO SEPARATE SITES WITHIN THE GROUNDS OF THE UNIVERSITY OF DURBAN, WESTVILLE.

# BANANA CITY - AERIAL PHOTO



IT WAS ORIGINALLY CONFINED TO A CONCEALED VALLEY BUT NOW INCLUDES A FLATTER SITE AT THE HEAD OF THE VALLEY. MANY OF THE ORIGINAL INHABITANTS WERE EMPLOYED AT THE UNIVERSITY AND LOCATED IN A VALLEY TO AVOID DETECTION.



# BANANA CITY - SITE PHOTOS

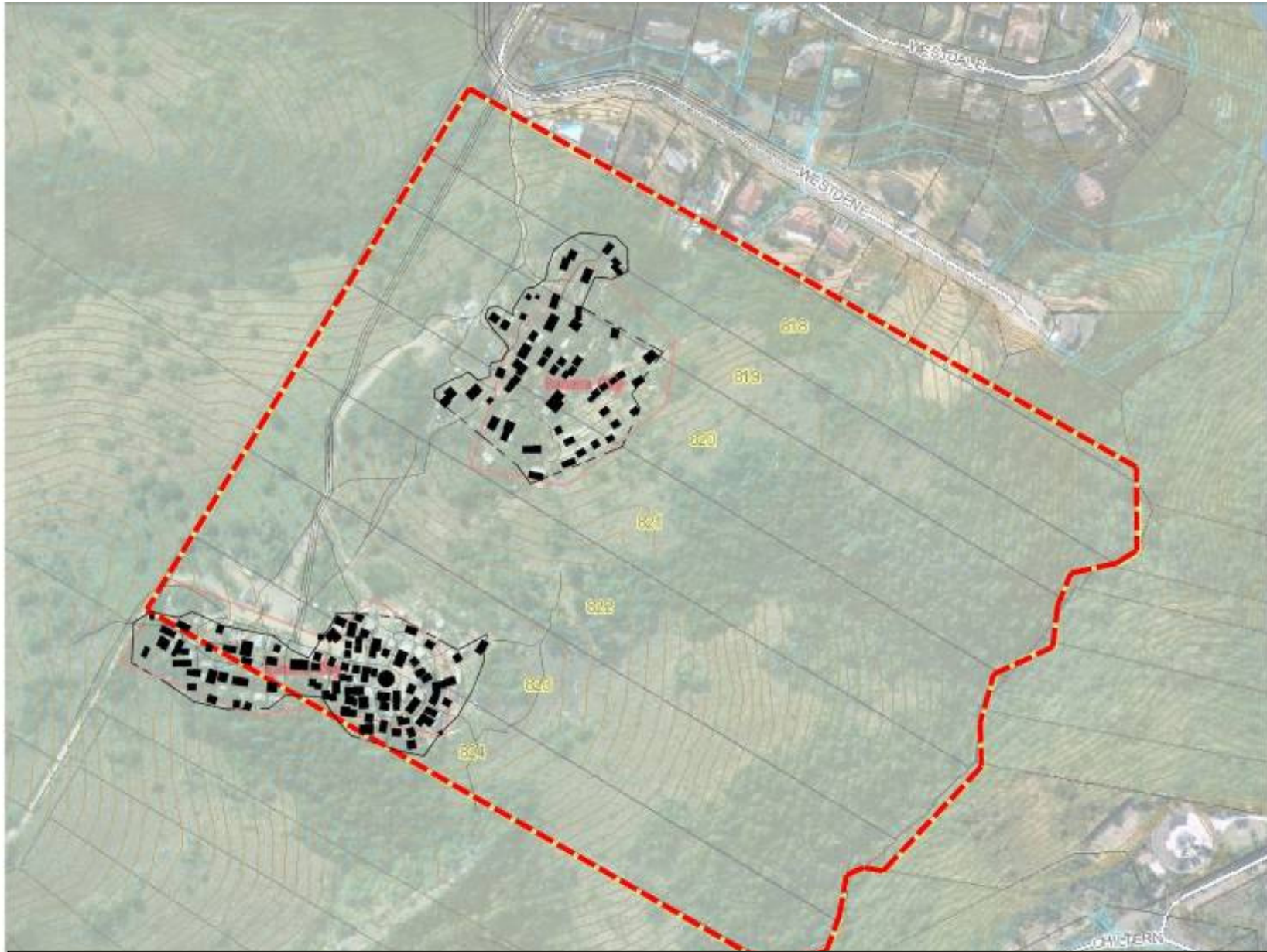


**THE LAYOUT AT THE FLATTER SITE ONCE AGAIN IS REFLECTIVE OF TRADITIONAL FORMS WITH HOUSING ARRANGED AROUND A CENTRAL SQUARE THAT ACCOMMODATES MANY OF THE SOCIAL AND RECREATIONAL FACILITIES REQUIRED. THE ROW-OF-ROOMS TYPOLOGY IS CLEARLY APPARENT ON THE STEEPER SLOPES. THESE ARE REFLECTIVE OF CHANGING CIRCUMSTANCES FOR THE OCCUPYING RESIDENTS WITH ROOMS AT VARIOUS TIMES EITHER ACCOMMODATING FAMILY OR FRIENDS OR BEING RENTED OUT AS A SOURCE OF INCOME.**





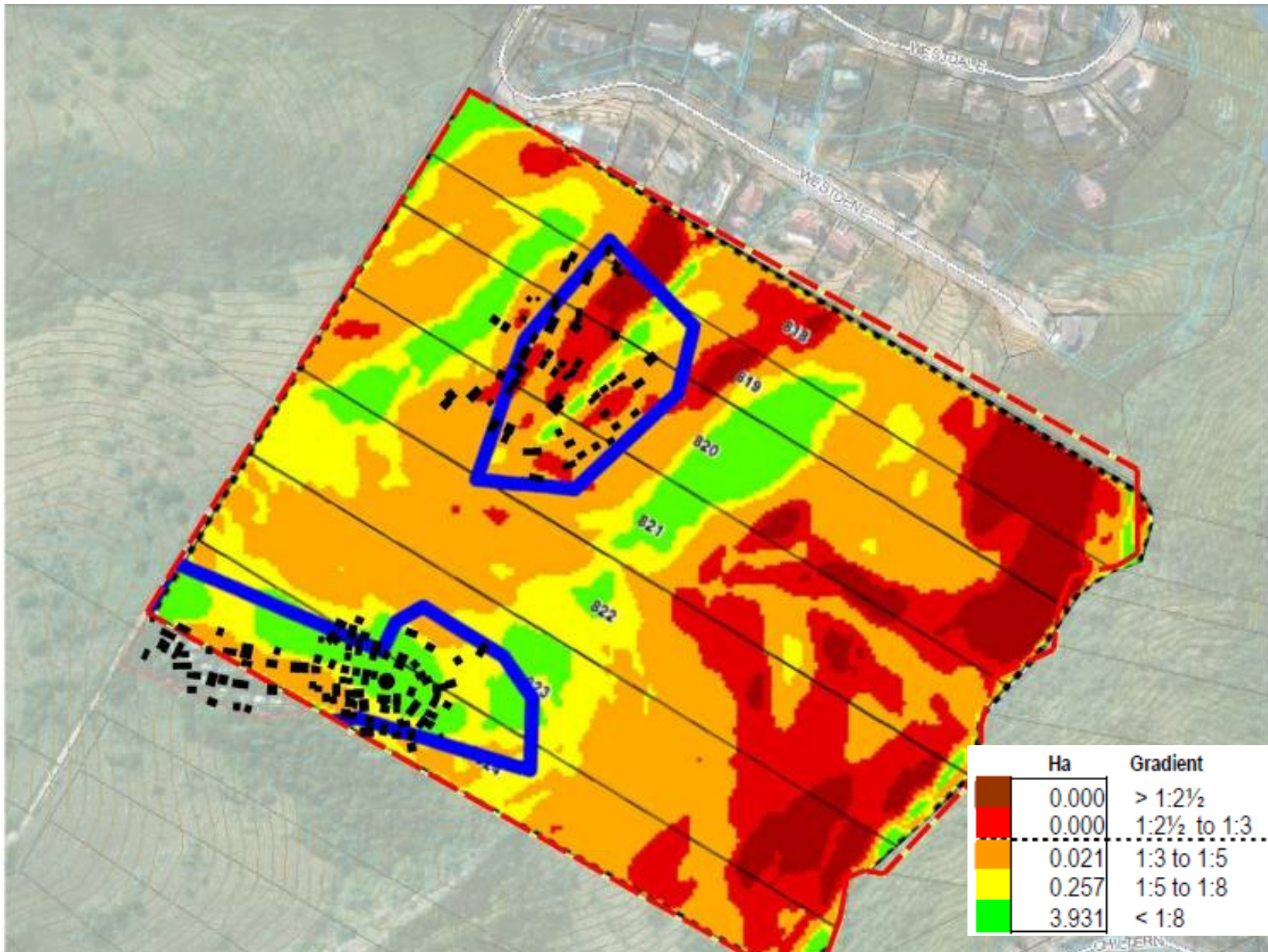
# BANANA CITY - EXISTING LAYOUT



**THE STEEPER 'CONCEALED VALLEY' VILLAGE IS LOCATED TO THE NORTH OF THE SITE WITH THE FLATTER 'TOWN SQUARE' SITE BEING TO THE SOUTH SITE.**



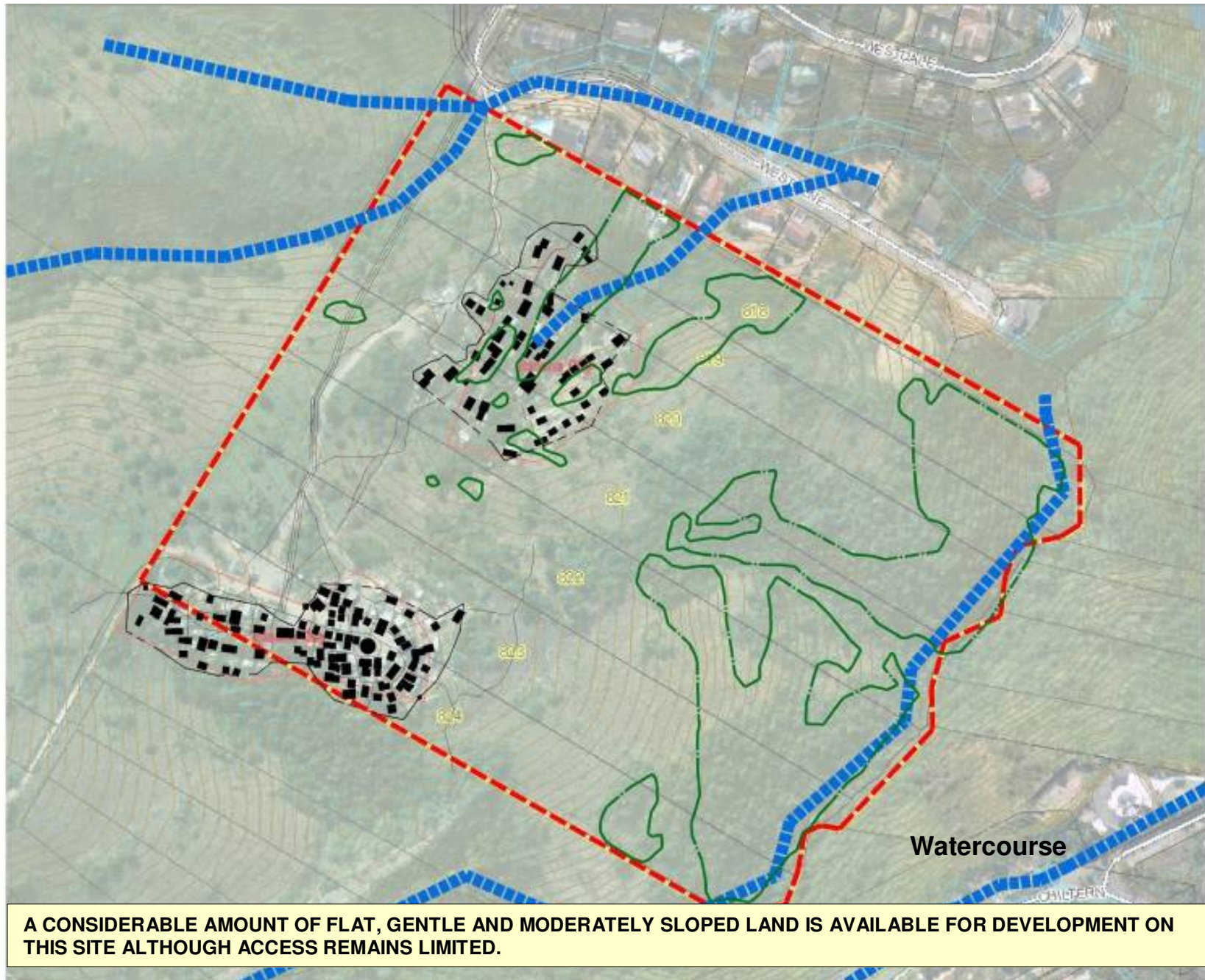
# BANANA CITY - SLOPE ANALYSIS



DENSITIES ARE CLEARLY HIGHER ON THE FLATTER SITE WHICH IS MORE COMPACT IN FORM WHIST THE VALLEY SITE LAYOUT IS REFLECTIVE OF THE CONTOURS .



# BANANA CITY - DEVELOPABLE AREA



A CONSIDERABLE AMOUNT OF FLAT, GENTLE AND MODERATELY SLOPED LAND IS AVAILABLE FOR DEVELOPMENT ON THIS SITE ALTHOUGH ACCESS REMAINS LIMITED.

# PILGRIMS X OVERVIEW



# PILGRIMS X - LOCALITY



## PILGRIMS X:

- IS 14.2HA IN EXTENT,
- IS ZONED PRIMARILY FOR GENERAL RESIDENTIAL 1 AND AS AN ENTERPRISE ZONE,
- COMPRISES 12 FORMAL ERVEN, THE MAJORITY OF WHICH ARE IN PRIVATE OWNERSHIP; AND
- CONTAINS 535 HOUSEHOLDS (1526 RESIDENTS).

THE SETTLEMENT IS LOCATED ON VACANT INDUSTRIAL LAND IN ISPINGO CLOSE TO THE AIRPORT.



# PILGRIMS X - AERIAL PHOTO





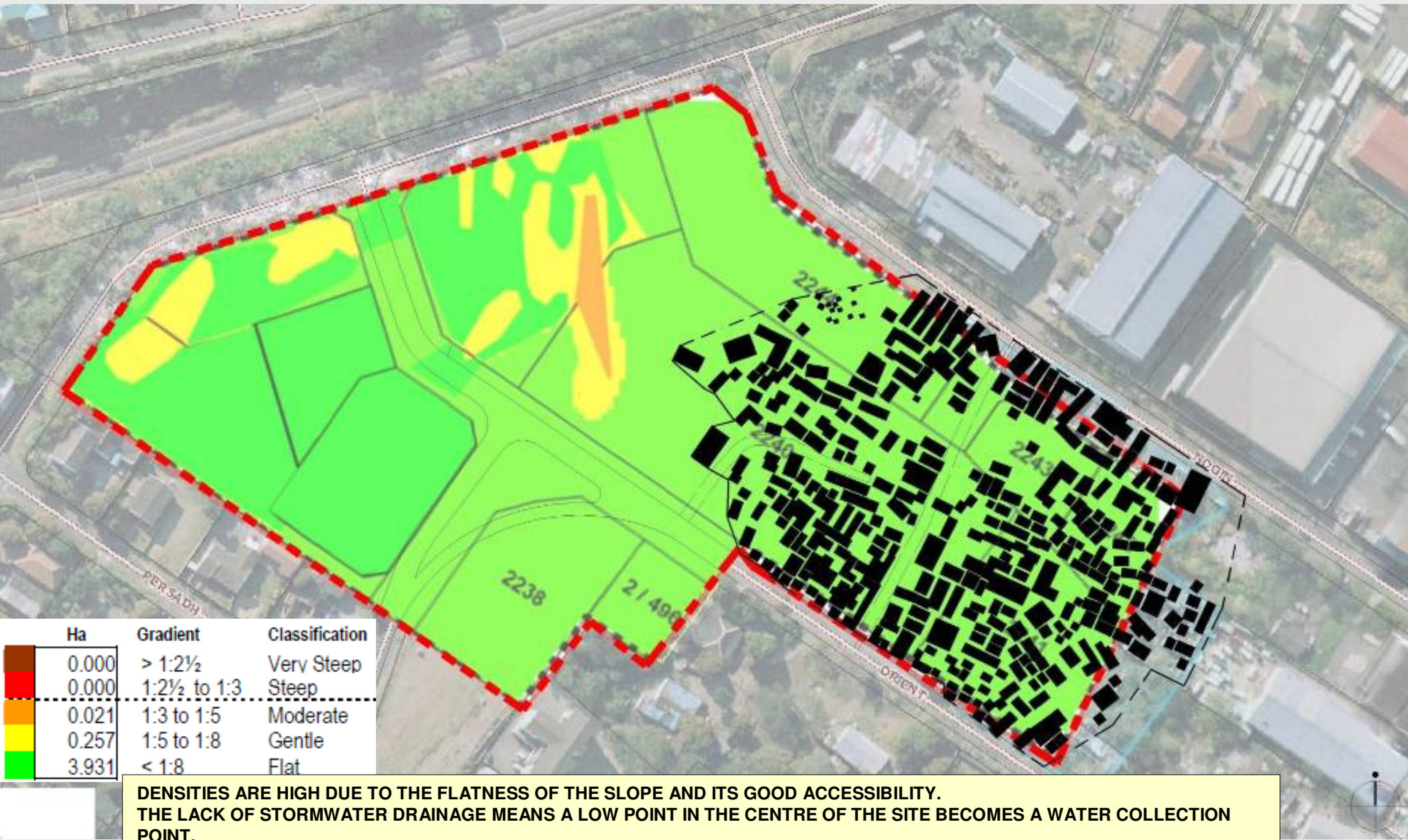
# PILGRIMS X - SITE PHOTOS



**HOUSE TYPOLOGIES ARE TYPICALLY LOW RISE, ELONGATED AND OFTEN ARRANGED IN COURTYARD CONFIGURATIONS ONCE AGAIN REFLECTING THE ABILITY OF THE UNIT TO BE ADAPTED TO THE CHANGING CIRCUMSTANCES OF THE OCCUPYING FAMILY.**

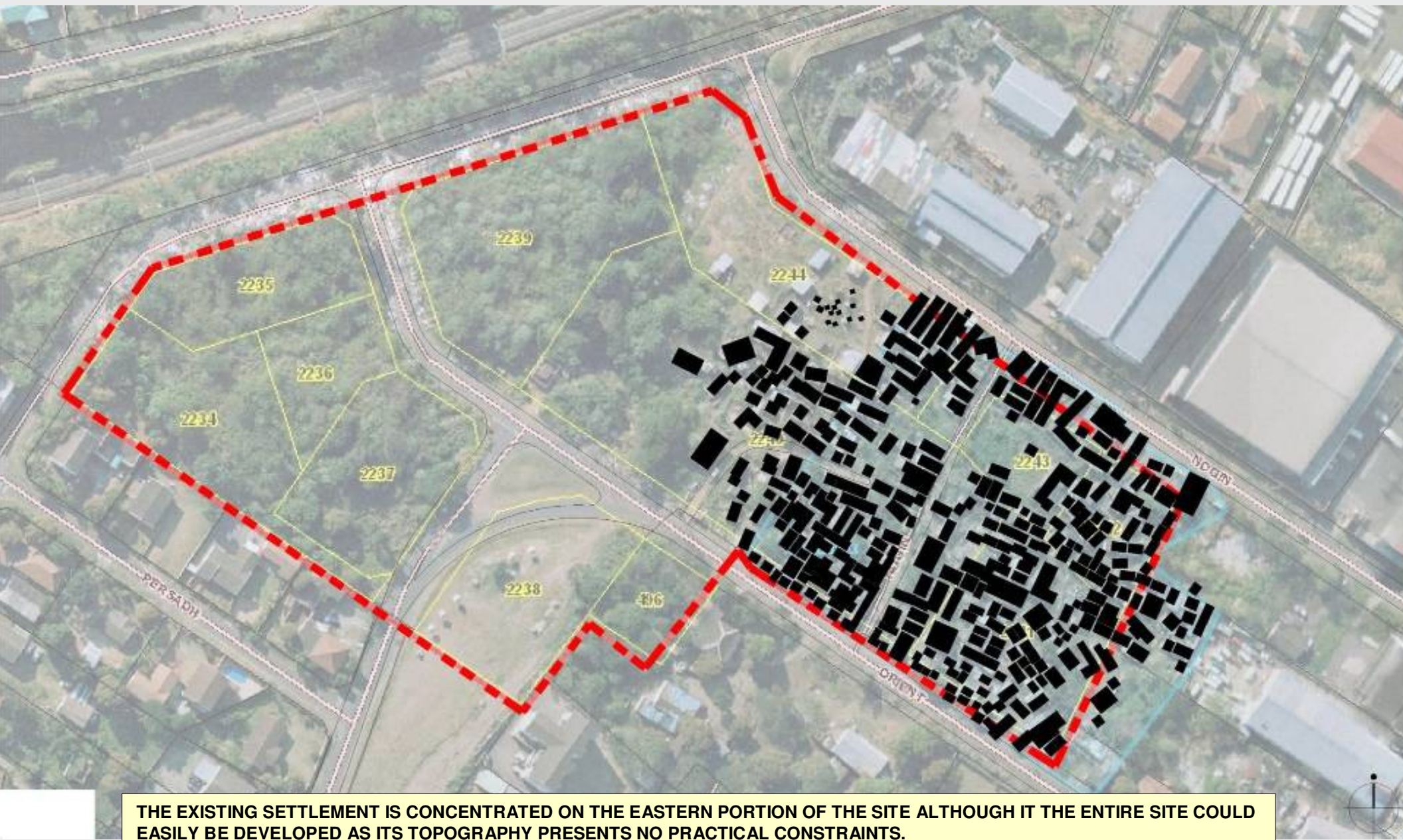


# PILGRIMS X – SLOPE ANALYSIS





# PILGRIMS X –EXISTING LAYOUT AND DEVELOPABLE AREA



THE EXISTING SETTLEMENT IS CONCENTRATED ON THE EASTERN PORTION OF THE SITE ALTHOUGH IT THE ENTIRE SITE COULD EASILY BE DEVELOPED AS ITS TOPOGRAPHY PRESENTS NO PRACTICAL CONSTRAINTS.

# DENSITY AND TOPOGRAPHY ANALYSIS

# DENSITY ANALYSIS

Density Analysis	Gumtree	Jadhu's Place	Banana City	Pilgrims X
Total site area (ha)	7.95	5.97	12.45	4.21
Site area currently used (ha)	2.53	1.39	1.27	1.68
Site area currently used (%)	31.78%	23.27%	10.24%	39.88%
Total developable area: moderate, gentle, flat (ha)	4.75	4.14	9.37	4.21
Total developable area (%)	59.75%	69.30%	75.27%	99.98%
Population	1,302.48	1,172.88	1,227.60	1,669.20
Ave household size (people)	3.24	3.24	2.79	3.12
Ave unit size (m2)	20.62	18.87	15.63	13.16
<b>Floor space rate (m2 / person within unit)</b>	<b>6.36</b>	<b>5.82</b>	<b>5.60</b>	<b>4.22</b>
No of households	402.00	362.00	440.00	535.00
Total floor area in m2 (no of households x ave unit size)	8,288.00	6,830.00	6,876.65	7,043.00
No of people per ha (total site area)	163.83	196.46	98.60	396.48
<b>No of people per ha (site area used)</b>	<b>515.49</b>	<b>844.10</b>	<b>963.13</b>	<b>994.28</b>
FAR for total site (floor area / total site area)	0.10	0.11	0.06	0.17
<b>FAR for site used (floor area / site area used)</b>	<b>0.33</b>	<b>0.49</b>	<b>0.54</b>	<b>0.42</b>
FAR for developable area (floor area / developable area)	0.17	0.17	0.07	0.17
No of households per ha for total site (hh / total site area)	50.57	60.64	35.34	127.08
<b>No of households per ha for site used (hh/ site area used)</b>	<b>159.10</b>	<b>260.53</b>	<b>345.21</b>	<b>318.68</b>
No of households per ha for developable area (hh / developable area)	84.63	87.50	46.95	127.11

Survey	Gumtree	Jadhu's Place	Banana City	Pilgrims X
Household site area (ha)	2.53	1.39	1.27	1.68
No of units surveyed	402	362	440	535
Actual no of units	402	362	167	535
Total household floor area (m2)	8,288.00	6,830.00	2,610.00	7,043.00
Average unit size	20.62	18.87	15.63	13.16

## KEY INDICATORS FROM THE DENSITY ANALYSIS INCLUDE:

- LESS THAN 40% OF LAND HAS BEEN DEVELOPED INFORMALLY– THE REMAINDER CONTAINS PRIMARILY STEEP AND VERY STEEP SLOPES.
- FAR RANGES FROM 0.33 (GUMTREE) TO 0.42 (PILGRIMS X) ON THE LAND CURRENTLY UNDER OCCUPATION.
- THE FLATTER THE SLOPE, THE MORE SPACE EACH PERSON HAS WITHIN THE UNIT (FLOOR SPACE RATE) - THIS RELATES TO THE FLATTER SITES BEING MORE ACCESSIBLE, EASIER TO DEVELOP AND THEREFORE MORE IN DEMAND. THIS IS ALSO REFLECTED IN THE HIGHER NUMBERS OF PEOPLE AND HOUSEHOLDS PER HECTARE ON THE FLATTER SLOPES



# TOPOGRAPHY ANALYSIS

Slope Analysis	Gumtree		Jadhu's Place		Banana City		Pilgrims X	
Classification	ha	% of extent	ha	% of extent	ha	% of extent	ha	% of extent
Very steep >1:2.5			0.96	16.00%	1.14	9.00%	0.00	0.00%
Steep 1:2.5 - 1:3	3.59	43.00%	0.88	15.00%	2.05	16.00%	0.00	0.00%
Moderate 1:3 - 1:5	2.51	30.00%	2.62	44.00%	5.69	45.00%	0.02	0.00%
Gentle 1:5 - 1:8	2.24	27.00%	1.10	18.00%	2.19	17.00%	0.26	6.00%
Flat <1:8			0.42	7.00%	1.49	12.00%	3.93	93.00%
<b>TOTAL</b>	<b>8.34</b>	<b>100.00%</b>	<b>5.97</b>	<b>100.00%</b>	<b>12.57</b>	<b>99.00%</b>	<b>4.21</b>	<b>99.00%</b>
Standard yield	Std yield / ha	Std site yield	Std yield / ha	Std site yield	Std yield / ha	Std site yield	Std yield / ha	Std site yield
Very steep >1:2.5			0	0.00	0	0.00	0	0
Steep 1:2.5 - 1:3	10	35.90	0	0.00	0	0.00	0	0
Moderate 1:3 - 1:5	25	62.75	20	52.36	20	113.78	20	0.42
Gentle 1:5 - 1:8	50	112.00	25	27.58	25	54.70	25	6.425
Flat <1:8			30	12.48	30	44.82	30	117.93
<b>TOTAL</b>		<b>210.65</b>		<b>92.42</b>		<b>213.30</b>		<b>124.775</b>
Enhanced yield	Enhanced yield / ha	Enhanced site yield	Enhanced yield / ha	Enhanced site yield	Enhanced yield / ha	Enhanced site yield	Enhanced yield / ha	Enhanced site yield
Very steep >1:2.5			0	0.00	0	0.00	0	0
Steep 1:2.5 - 1:3	15	53.85	20	17.58	20	41.08	20	0
Moderate 1:3 - 1:5	40	100.40	50	130.90	50	284.45	50	1.05
Gentle 1:5 - 1:8	75	168.00	80	88.24	80	175.04	80	20.56
Flat <1:8			70	29.12	70	104.58	70	275.17
<b>TOTAL</b>		<b>322.25</b>		<b>265.84</b>		<b>605.15</b>		<b>296.78</b>

## KEY INDICATORS FROM THE TOPOGRAPHY ANALYSIS INCLUDE:

- INFORMAL HOUSING HAS BEEN CONSTRUCTED ON ALL SLOPES, FROM FLAT TO VERY STEEP.
- A STANDARD DEVELOPMENT OF FREESTANDING HOUSES AND ROAD ACCESS TO ALL SITES WOULD YIELD RESIDENCES TO ACCOMMODATE BETWEEN A SIXTH (PILGRIMS X) AND A THIRD (JADHU'S PLACE, BANANA CITY) OF THE DESIGN POPULATION
- A DEVELOPMENT OF ALTERNATIVE HOUSING TYPOLOGIES (ATTACHED UNITS, DOUBLE STOREYS ETC) AND WITH A LARGELY PEDESTRIANISED MOVEMENT SYSTEM WOULD YIELD RESIDENCES TO ACCOMMODATE BETWEEN 37% (PILGRIMS X) AND 90% (JADHU'S PLACE, BANANA CITY) OF THE DESIGN POPULATION.



# SHORTFALL ASSESSMENT

Shortfall Analysis	Gumtree		Jadhu's Place		Banana City		Pilgrims X	
Total developable area	4.750		4.137		9.371		4.209	
Total design population (persons)	1,302.48		543.00		1,841.00		2,505.00	
Total design population (households)	402.00		167.59		659.86		802.88	
No of households per ha for developable area								
Shortfall using standard yield	-191.35		-75.18		-446.56		-678.11	
Shortfall using enhanced yield	-79.75		98.25		-54.71		-506.10	

Adjusted shortfalls using steep slope typology	Gumtree		Jadhu's Place		Banana City		Pilgrims X	
Very steep >1:2.5			16.00%	0.96	9.00%	1.14	0.00%	0.00
Steep 1:2.5 - 1:3	43.00%	3.59	15.00%	0.88	16.00%	2.05	0.00%	0.00
<b>TOTAL</b>	<b>43.00%</b>	<b>3.59</b>	<b>31.00%</b>	<b>1.84</b>	<b>25.00%</b>	<b>3.20</b>	<b>0.00%</b>	<b>0.00</b>
Units per ha (stand alone single storey)	20.00	8.60	20.00	19.14	20.00	22.84	20.00	0.00
Units per ha (stand alone single storey)	28.00	12.04	28.00	24.61	28.00	57.51	28.00	0.00
<b>TOTAL</b>		<b>20.64</b>		<b>43.75</b>		<b>80.35</b>		<b>0.00</b>
Units per ha (stand alone double storey)	40.00	17.20	40.00	38.28	40.00	45.68	40.00	0.00
Units per ha (stand alone double storey)	56.00	24.08	56.00	49.22	56.00	115.02	56.00	0.00
<b>TOTAL</b>		<b>41.28</b>		<b>87.50</b>		<b>160.70</b>		<b>0.00</b>
Units per ha (semi detached single storey)	32.00	13.76	32.00	7.45	32.00	36.54	32.00	0.00
Units per ha (semi detached single storey)	32.00	13.76	32.00	28.13	32.00	65.73	32.00	0.00
<b>TOTAL</b>		<b>27.52</b>		<b>35.58</b>		<b>102.27</b>		<b>0.00</b>
Units per ha (semi detached double storey)	64.00	27.52	64.00	61.25	64.00	73.09	64.00	0.00
Units per ha (semi detached double storey)	64.00	27.52	64.00	56.26	64.00	131.46	64.00	0.00
<b>TOTAL</b>		<b>55.04</b>		<b>117.50</b>		<b>204.54</b>		<b>0.00</b>

## IN CONVENTIONAL INFORMAL RESIDENTIAL UPGRADE PROJECTS IN ETHEKWINI:

- SLOPES FLATTER THAN 1:5 ARE REGARDED AS FULLY DEVELOPABLE,
- SLOPES FROM 1:3 TO 1:5 ARE REGARDED AS MARGINALLY DEVELOPABLE,
- SLOPES STEEPER THAN 1:3 ARE REGARDED AS UNDEVELOPABLE

AS ALL THE SETTLEMENTS HAVE SIGNIFICANT AREAS REGARDED AS CONVENTIONALLY UNDEVELOPABLE, IT IS CLEAR THAT DENSITIES NEED TO BE INCREASED ON ALL SLOPES USING 'TIGHTER' URBAN LAYOUTS AND MORE COMPACT HOUSING TYPOLOGIES AND NEW TYPOLOGIES APPLICABLE FOR DEVELOPMENT ON STEEP AND VERY STEEP SLOPES ARE TO BE SOUGHT.

THE TABLE ABOVE INDICATES PERCENTAGES AND ACTUAL NUMBERS OF ADDITIONAL UNITS THAT COULD POTENTIALLY BE ACCOMMODATED ON STEEP AND VERY STEEP SLOPES USING A RANGE OF ALTERNATIVE HOUSING TOPOLOGIES.