

LAND AVAILABILITY FOR INDUSTRIAL BUILDINGS WITH HIGH FLOOR LOADS IN THE WESTERN BAY OF PLENTY

SmartGrowth Bay of Plenty

GENZTAUC15724AA
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CONTENTS

1	PROJECT BRIEF	1
2	SCOPE AND OBJECTIVES	1
3	REPORTS AND REFERENCES	1
4	LIMITATIONS	1
5	ASSUMPTIONS & DEFINITIONS	2
	5.1 Industrial Land	2
	5.2 Excluded Land	2
	5.3 Heavy Buildings	2
	5.4 Typical Development Options	3
	5.5 Site Vacancy/Occupancy	4
	5.6 Relative Development Complexity	4
6	RESULTS	6
	6.1 Industrial Land Availability	6
	6.2 Readily Developable Land by Access Corridor	7
7	POSSIBLE FUTURE INDUSTRIAL LAND	8
8	OTHER PLANNING CONSIDERATIONS	9
9	DISCUSSION & CONCLUSIONS	9
	9.1 Other Heavy Industrial Activities	10

Figures

Figure 0:	Index of Figures
Figure A:	Map of all Industrial zone land
Figure B:	Legend to Industrial land maps
Figures 1 to 20:	Maps of Industrial zoned land by development complexity
Figures 21 to 24:	Maps of readily available industrial land by access corridor
Figures 25 to 26:	Maps of future development land

Appendices

Appendix 1:	Bibliography
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1 PROJECT BRIEF

This report has been prepared for and in accordance with instructions from SmartGrowth Bay of Plenty. The report is intended to assist in assessing the need for additional land for the purposes of future industrial developments requiring high building loads.

2 SCOPE AND OBJECTIVES

The scope of this report includes a review of existing heavy industrial activities within the wider Tauranga district, and an assessment of the remaining Industrial zoned land which may be suitable and available for heavy industrial development in the future.

Its principal objectives are to:

- Define heavy industrial development and determine what geotechnical parameters influence the suitability of land for such development;
- Map existing Industrial zoned land within the Western Bay of Plenty and determine the vacancy or current occupancy of the existing Industrial lots;
- Identify and map Industrial zoned land which may be suitable for heavy building loads following either relatively easy, moderate or substantial ground improvement works, or with structural solutions.

3 REPORTS AND REFERENCES

This review has made use of a number of earlier reports completed by other parties. The main references used for overall project definition and regional land assessments are listed below. Numerous site specific geotechnical sources have also been referenced. A full list of references is provided in Appendix 1.

1. Tauranga City Council Environmental Policy Division (June 2011), "Tauranga City Industrial Land Survey 2011", TCC ref: 4066530.
2. S&L Consultants Ltd (November 2011), "Geotechnical Review of Industrial Land Available for Large Buildings within Western Bay of Plenty", S&L ref: 19406.
3. McDermott Consultants (September 2012) "Industrial Land Research: Western Bay of Plenty Industrial Land Study".

4 LIMITATIONS

The results and conclusions discussed in this report are based on a large scale review of geotechnical data and existing heavy industrial developments within the Bay of Plenty. The report is intended to aid in regional planning, and should not preclude detailed site investigation or geotechnical engineering input at the feasibility and/or design stages of a project. Heavy industrial developments within the Western Bay of Plenty will almost certainly require specific investigation and geotechnical design works regardless of the zone assigned to the land in this report. This work will need to be undertaken by a suitably qualified geotechnical professional.

5 ASSUMPTIONS & DEFINITIONS

The following sections outline the assumptions and define the terms used in this assessment.

5.1 Industrial Land

The term 'Industrial Land' refers to all land zoned 'Industrial Business' and 'Papamoa East Employment' in the Operative Tauranga District Plan and 'Industrial' in the Western Bay of Plenty District Plan. The Te Tumu block of eastern Papamoa has been included as this has been marked as future business land, part of which is likely to be zoned 'Industrial'.

Sites which have been excluded from this study are listed in Section 5.2.

5.2 Excluded Land

The following land categories have been excluded from this assessment:

1. Land zoned for 'Port Business' by the TCC.
2. Land which is deemed not suitable or not available for industrial development in the Tauranga City Industrial Land Survey, 2011 (reference 1 above). This land is considered unavailable due to its existing or future use (e.g. reserves, stormwater or wastewater treatment, NZTA road corridors) or unsuitable due to steep terrain. The land was excluded at TCC direction to ensure this report is consistent with the Tauranga City Industrial Land Survey, 2011.
3. Cut batters in Tauriko Business Estate Stage 1 which are in land which has already been subdivided and cannot easily be 'reworked' in the future.
4. Existing wastewater oxidation ponds.

5.3 Heavy Buildings

'Heavy Buildings' are defined as structures with higher than normal floor or foundation loads, for which the weight of the building or its contents must be specifically considered during the design process. Floor or foundation loads may lie between 10kPa and 100kPa depending on the proposed structure and its use. This is compared to 3 to 5kPa for a typical dwelling and less than 10kPa for a typical light commercial building.

Common types of heavy industrial buildings and their approximate ground loads are shown on Table 1 below, along with existing examples from the Bay of Plenty area. It is estimated that approximately 90-95% of heavy buildings will have ground loads of 50kPa or less. Of the remaining 5-10%, most buildings will be less than 80kPa. Buildings with loads of the order of 100kPa are rare.

Historically, it has been common for industrial subdivisions in New Zealand to provide finished lots which have been engineered for maximum building loads of up to 10 or 20kPa. Although there is some demand for land with greater load bearing capacity, geotechnical constraints usually make it uneconomic for developers to provide such capacity at the subdivision stage. The construction of buildings with floor or foundation loads of more than 20kPa therefore almost always requires specific geotechnical input and detailed design. This is particularly the case in the Western Bay of Plenty due to the prevailing local ground conditions.

Table 1: Types of building by ground load with local examples

Load	Building Types	BoP Examples	Approximate Percentage
3 – 10 kPa	Light-weight timber buildings, single or double storey concrete office blocks, low-rise buildings not used for bulk storage (e.g. showrooms, retail space, etc).	Large warehouse retail (e.g. Bunnings, Mitre 10), general commercial buildings (e.g. garages, workshops, etc.)	80-85%
10 – 20 kPa	Packhouses, factories with light mobile plant, general light warehousing, etc.	Boat-stack, kiwifruit packhouses, etc.	8-12%
20 – 50 kPa	Coolstores and atmosphere controlled facilities, tanks < 5m high, heavy goods storage, large distribution centres, container storage and port facilities, coal storage, heavy warehousing, etc.	Foodstuffs distribution centre, prefabricated concrete or steel manufacturing, timber yards, Seeka, Zespri, Trevelyn, coolstores, etc.	4-6%
50 – 100 kPa	Fertiliser or cement silos, grain stores, palm kernel stores, tanks > 5m high, etc.	Balance, Ravensdown, Tui Garden Products, etc.	1-3%

5.4 Typical Development Options

Development of sites for heavy industrial use typically requires earthworks and geotechnical input over and above that needed for residential or light commercial projects. Common development and ground improvement methods used for heavy developments include:

- **Pre-loading** - Sites or building platforms are covered with a specified depth of temporary earth fill material to induce settlement before the building is constructed. Pre-load fill depths are typically of the order of several metres and are normally designed to be equal to or greater than the weight of the proposed building. The load is often left in place for between 6 and 24 months depending on the underlying soils, and is removed before construction begins. Additional loads can be placed to speed the process up.
- **Engineered Fill Rafts** – A ‘raft’ of suitably compacted engineered fill can be placed over weak ground, creating a pad beneath the building’s foundations.
- **Load Compensation** – On elevated sites, earthworks can be undertaken to lower the ground level of the building platform, removing an equivalent load of soil to the final design load of the building. Cut depths of up to 7m may be required for very heavy buildings (i.e. 100kPa loads).

- **Piling** – The building may be constructed on piled foundations, which transfer building loads to stronger material which may exist at depth beneath a site. Pile depths of up to 20m are not uncommon.

This list is not exhaustive and alternative ground improvement or foundation design measures may be specified by a qualified geotechnical engineer. The final selection of site development options and the design of the proposed heavy building foundations will depend on project specific factors such as cost, construction times and exposure to risks such as seismic induced liquefaction or slope instability.

5.5 Site Vacancy/Occupancy

The status of the existing Industrial zoned sites has been assessed in accordance with the definitions set out in the Tauranga City Council (TCC) Industrial Land Survey 2011 (reference 1). These are:

Occupied Industrial Land – Industrial zones sites where over 50% of the land contained structures, plant or material.

Partially Vacant Industrial Land – Industrial zoned sites where up to and including 50% of the land contains structures, plant or material.

Vacant Industrial Land – Industrial zones sites that contain no structures and are largely clear of plant and material.

For the purpose of this report, the vacant and partially vacant lots have been combined such that the areas shown as being 'vacant' on the figures discussed below may either be totally vacant (i.e. containing no permanent structures or plant), or may be partially vacant (i.e. less than 50% of the lot area is covered by permanent structures, plant or material).

For ease of comparison with that report, land deemed vacant or partially vacant in that report have been adopted for this report, rather than updating and re-interpreting based on today's land occupancy. For that reason, there may be land deemed vacant in this report that has now been fully developed and vice-versa, although it is expected that the areas affected would be relatively minor.

5.6 Relative Development Complexity

The Industrial zoned land reviewed in this report has been divided into three broad categories based on an assessment of topography and likely underlying geological conditions. Information has been obtained from topographical (contour) data, existing geotechnical and geological reports provided by TCC and extrapolation or local knowledge where existing reports are not available.

The categories are referred to as 'easy', 'medium' and 'difficult', indicating an increasing scale of complexity and cost of development. The three categories are defined in Table 2. A brief description of possible development and ground improvement requirements for each of the categories is also provided.

Table 2: Comparison of relative development complexity and indicative development options for typical sites (a combination of several options may be required for any given site)

Category	Ground Condition	Indicative Development Options
Relatively Easy	Ridges or elevated ground above 10m contour underlain by non-sensitive soils	<ul style="list-style-type: none"> • Load compensation i.e. earthworks to cut elevated ground down by 3m to 6m • Structural modifications
Medium	Valleys and low-lying inland sites underlain by < 2.0m of peat or unsuitable material	<ul style="list-style-type: none"> • Remove peat/unsuitable material and replace with engineered fill • Pre-load • Piles • Structural modifications
	Ridges and slopes below 10m contour underlain by strong, non-sensitive soils	<ul style="list-style-type: none"> • Pre-load • Piles • Structural modifications
	Ridges or elevated ground above 10m contour underlain by sensitive soils (e.g. Te Puke ridges)	<ul style="list-style-type: none"> • Load compensation • Pre-load • Piles • Structural modifications
	Coastal areas subject to liquefaction	<ul style="list-style-type: none"> • Earthworks • Piles • Structural modifications
Relatively Difficult	Valleys, estuarine areas and low-lying sites underlain by > 2.0m of peat or unsuitable soil (including non-engineered fill)	<ul style="list-style-type: none"> • Extensive earthworks • Pre-load • Deep piles • Structural modifications

It is important to note that the categories in Table 2 are relative only. A rating of 'relatively easy' does not necessarily mean that a particular building can be constructed on a site in its current form, only that the site is considered generally suitable for a typical heavy industrial project with relatively minimal preparation. Similarly, a 'relatively difficult' rating does not mean that heavy construction on a particular site is impossible, although development on these areas is likely to be relatively expensive and/or time-consuming. Several examples of heavy industrial buildings on 'relatively difficult' land exist in the Tauranga area.

A more accurate classification of a given site would depend on the specifics of the project proposed, taking into account any given client's cost and time constraints among other factors. Several lots within the areas discussed in this report are already subject to resource consent applications. In some cases, consent has already been granted for industrial development on specific lots. Satisfactory completion of the works described in these consents (including time allowed for pre-loading and induced settlements) could reduce the time and cost of later heavy industrial development on the affected lots.

Industrial sites or subdivisions may have other restrictions or geotechnical requirements which may reduce the area available for heavy building. Such restrictions could include offsets from rivers or streams, or from steep slopes which remain following completion of the bulk earthworks. Such restrictions or reductions in the available area are outside the scope of this report but could result in the areas available for future development being cut by 30% to 50% depending on the final development plans.

6 RESULTS

An index of figures, a regional map showing the locations of all Industrial zoned land and a legend to the Industrial land maps are included as Figures 0, A and B respectively. Following this, the results of this assessment are presented on Figures 1 to 24. These figures illustrate the following features:

- The boundaries of existing Industrial Zones (Source: BoP Regional Council)
- The locations of 'vacant' and 'partially vacant' Industrial zoned sites (Section 5.4)
- The development complexity category (Section 5.6)
- Port land and other sites excluded from this assessment
- Land prone to flooding (Source: BoP Regional Council)
- The locations and approximate loads of existing heavy industrial developments (not exhaustive)

The three development complexity categories are shown as yellow (relatively easy), orange (medium) and brown (relatively difficult). Two shades of each colour are used. The dark shades indicate sites with existing geotechnical information and where the subsurface conditions are relatively well known. Lighter shades indicate sites where there is little or no available subsurface information and conditions have been assumed from nearby sites and local knowledge.

6.1 Industrial Land Availability

The total amount of land available for future heavy industrial development in the Western Bay of Plenty area is shown on Table 3. The areas given are for all land regardless of whether that land is currently deemed vacant or occupied.

Table 3: Summary of Industrial land for the total Western Bay of Plenty area

Western Bay of Plenty		Area (Ha)	Percentage
Total Industrial zoned land		1596.8	100%
Relative Development Complexity for High Load Buildings	Easy	204.5	13%
	Medium	1000.4	63%
	Difficult	391.9	24%

* includes vacant and occupied land

6.2 Readily Developable Land by Access Corridor

The areas shown on Table 3 are further divided into four sub-regions below. The Northern Corridor includes Industrial zoned land which lies along the main access routes from Tauranga to Auckland and other northern centres. The Western and Eastern Corridors respectively lie along the main routes to Taupo and the Waikato, and to Te Puke, Whakatane and Rotorua, etc. The Central Corridor includes Industrial zoned land which may service the Port of Tauranga, central Tauranga and Mount Manganui.

Note: 'Readily developable land' is defined as Industrial zoned land which is either 'vacant' or 'partially vacant' as given in the TCC Industrial Land Survey report, and is classified as either 'relatively easy' or 'medium' in terms of development difficulty (i.e. 'relatively difficult' land is excluded). The lots must also be of sufficient size to allow heavy building construction. Isolated, small lots (i.e. less than 50m width) which on their own are considered too small for heavy industrial buildings are excluded. Small lots which lie adjacent to each other and which could be combined to form a larger site have been included in the calculations.

The area of readily developable land within each of the four corridors is shown in Tables 4 to 7 below. The parcels of land included in the tables are illustrated on Figures 21 to 24. Table 8 summarises all four corridors and provides total readily developable Industrial zoned land in the Western Bay of Plenty.

Table 4: Summary of readily developable Industrial zoned land along the Northern Corridor

Northern Corridor		Area (Ha)	Percentage
Total developable Industrial zoned land		66.2	100%
Relative Development Complexity for High Load Buildings	Easy	62.8	95%
	Medium	3.4	5%

Table 5: Summary of readily developable Industrial zoned land along the Western Corridor

Western Corridor		Area (Ha)	Percentage
Total developable Industrial zoned land		179.4	100%
Relative Development Complexity for High Load Buildings	Easy	94.5	53%
	Medium	84.9	47%

Table 6: Summary of readily developable Industrial zoned land along the Eastern Corridor

Eastern Corridor		Area (Ha)	Percentage
Total developable Industrial zoned land		469.5	100%
Relative Development Complexity for High Load Buildings	Easy	-	-
	Medium	469.5	100%

Table 7: Summary of readily developable Industrial zoned land along the Central Corridor

Central Corridor		Area (Ha)	Percentage
Total developable Industrial zoned land		70.9	100%
Relative Development Complexity for High Load Buildings	Easy	1.7	2%
	Medium	69.2	98%

Table 8: Summary of total readily developable Industrial zoned land, Western Bay of Plenty

Central Corridor		Area (Ha)	Percentage
Total developable Industrial zoned land		785.0	100%
Relative Development Complexity for High Load Buildings	Easy	159.0	20%
	Medium	626.0	80%

7 POSSIBLE FUTURE INDUSTRIAL LAND

As part of the SmartGrowth Strategy update, a report was commissioned to assess the likely long-term demand for industrial land and the implications on the quantum, general location and economic viability of additional land that might be included in the SmartGrowth Strategy for industrial purposes. This report is referenced in section 3 as McDermott Consultants (September 2012) "Industrial Land Research: Western Bay of Plenty Industrial Land Study".

The McDermott report concluded that, looking towards 2051, more land is likely to be required in the Western Corridor and recommended an investigation of additional land for industrial development occur in the Western Corridor in the medium-term.

On the basis of this recommendation, two parcels of land which are not currently included in the SmartGrowth Settlement Pattern have been included in the maps which accompany this report (Figures 25 and 26). The development complexity of these areas has been assessed in accordance with the same criteria used above. The results are shown for reference in Table 9. However, as this land is not within the current SmartGrowth Settlement Pattern, it has not been included in the calculations and data presented in section 6 above.

Table 9: Summary for Possible Future Industrial Land

Possible Future Industrial Land		Area (Ha)	Percentage
Total possible Industrial zoned land		403.5	100%
Relative Development Complexity for High Load Buildings	Easy	259.7	64%
	Medium	74.3	19%
	Difficult	69.5	17%

For these areas, the proposed future landform is yet unknown and for that reason contours at 10m intervals have been included on these plans to give some indication as to the volume of earthworks that may be required to make the land developable for heavy buildings and to allow some indication of the area of land that would be considered unsuitable for heavy buildings due to being either too steep, too close to steep slopes or adjacent to streams or rivers. Depending on the development plan selected, the areas illustrated as relatively easy given on Figure 26 could be reduced by up to 30% to 50%.

8 OTHER PLANNING CONSIDERATIONS

This report has focussed on the geotechnical constraints of heavy industrial projects. Other key factors that would affect a site's suitability for any given end use could include cost and project budget, planning matters, development time, ease of site access (both during and after construction) and proximity to supporting infrastructure like major roads, ports or rail facilities.

As noted in Section 5.6, the fact that a particular site is located on 'difficult' ground does not exclude heavy industrial development at that location, it just indicates that the cost and/or time required to develop the site is likely to be a major factor in the project's feasibility assessment. It is possible to build on almost any site given sufficient budget for site preparation or foundation construction. It is also possible to reduce the time required to develop a site by selecting a more expensive foundation design, for example by choosing to place a building on piled foundations rather than pre-loading the building platform. Several examples of sites which are zoned 'difficult' where heavy buildings have been sited exist, as shown on the attached plans.

9 DISCUSSION & CONCLUSIONS

At the time of writing there are approximately 1597 hectares of Industrial zoned land within the Western Bay of Plenty. The majority of this land is classed as being 'medium' (63%) or 'difficult' (24%) in terms of development complexity, although this on its own should not preclude heavy industrial construction in

these areas. As noted above, many existing heavy industrial buildings in the Bay of Plenty are located on 'medium' or 'relatively difficult' land and presumably the benefits of factors such as proximity of major roads or other infrastructure overcame the additional cost of developing these properties.

Of the total area of Industrial land, approximately 785 Ha (or 48%) is considered to be readily developable at the time of writing (i.e. the land is currently 'vacant' or 'partially vacant', is of suitable size and of 'easy' or 'medium' development complexity). Approximately 60% of this is located along the Eastern Corridor, and 23% along the Western Corridor. The remaining 17% is split between the Northern and Central Corridors, with approximately 66Ha and 71Ha respectively.

It should also be noted that by providing 'easy' land, this does not currently preclude it's purchase and occupation by lightweight buildings, as has occurred frequently around the Bay of Plenty.

9.1 Other Heavy Industrial Activities

This study has focussed on heavy industrial buildings. This is not to say however that other high-load industrial activities, such as coal or sand stockpiling for example, may not carry significant geotechnical risk. Although stockpiles or other outdoor storage activities may not themselves be adversely affected by ground settlement, they have the potential to cause damage to neighbouring structures, or may cause large scale 'bearing capacity' failure of underlying ground if founded on poor soils.

It is generally recommended that any high-load development within the Bay of Plenty should be subject to specific geotechnical input from a suitably qualified professional. This is particularly important where the site is underlain by weak materials, such as estuarine or low-lying valley sediments, non-engineered fill or reclaimed land.

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Figures

SMARTGROWTH ROAD BUILDING PROJECT GEOTECHNICAL FIGURE INDEX

Figure Number	Figure Title	Rev 0
0	Figure Index	
A	Study Area	
B	Legend	
1	Waihi Beach, WBOPDC	
2	Katikati North, WBOPDC	
3	Katikati South, WBOPDC	
4	Omokoroa, WBOPDC	
5	Te Puna Station Road, WBOPDC	
6	Tauriko, Tauranga	
7	Maleme Street, Tauranga	
8	Greerton, Tauranga	
9	Judea, Tauranga	
10	Sulphur Point, Tauranga	
11	Mount Maunganui North	
12	Mount Maunganui Central	
13	Mount Maunganui South	
14	Owens Place, Tauranga	
15	Te Maunga, Mangatawa	
16	Wairakei-Te Tumu, Papamoa	
17	Te Puke, WBOPDC	
18	Rangiuru, WBOPDC	
19	Paengeroa, WBOPDC	
20	Maketu, WBOPDC	

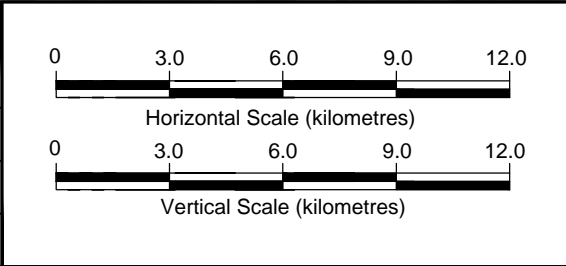
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							date	01/05/2013		title: FIGURE INDEX		
							scale	NA		project no: GENZTAUC15724AA		
							original size	A3		figure no: 0	rev: 0	



Base drawing reference - Aerial Photo, dated 2012

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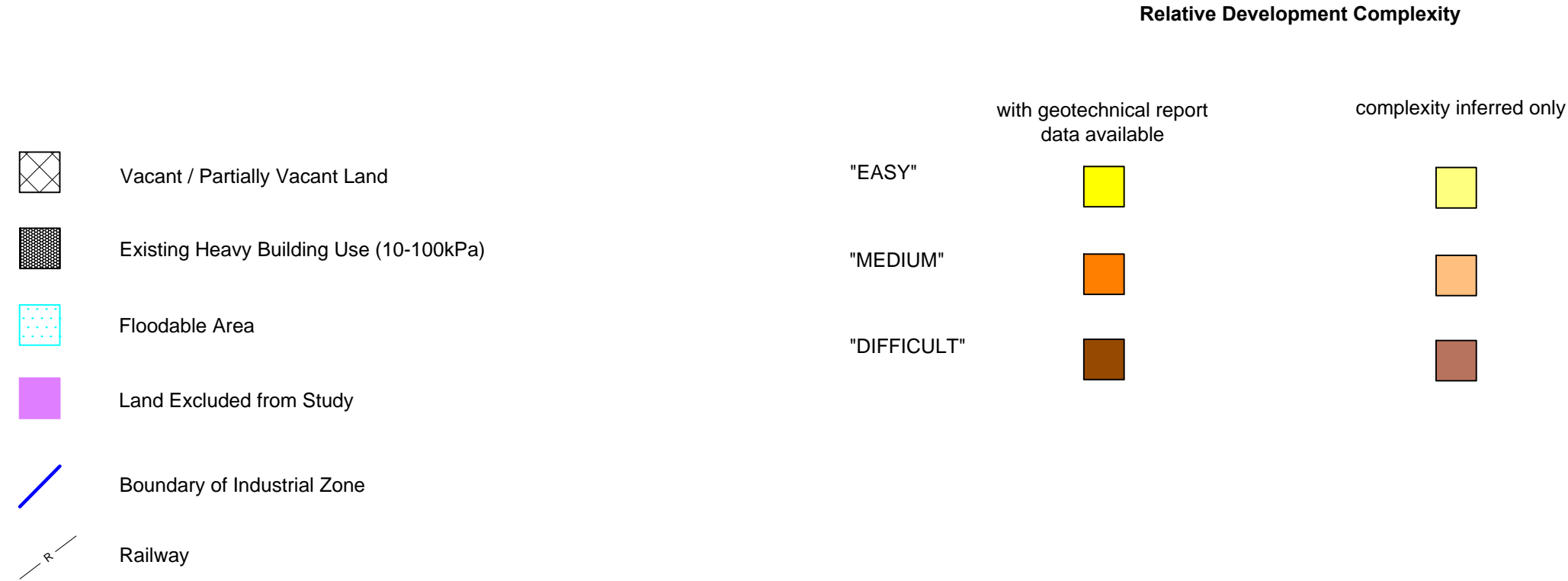
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approved	SVH
date	01/05/2013
scale	1:200,000
original size	A3




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SPECIALISTS MANAGING
THE EARTH

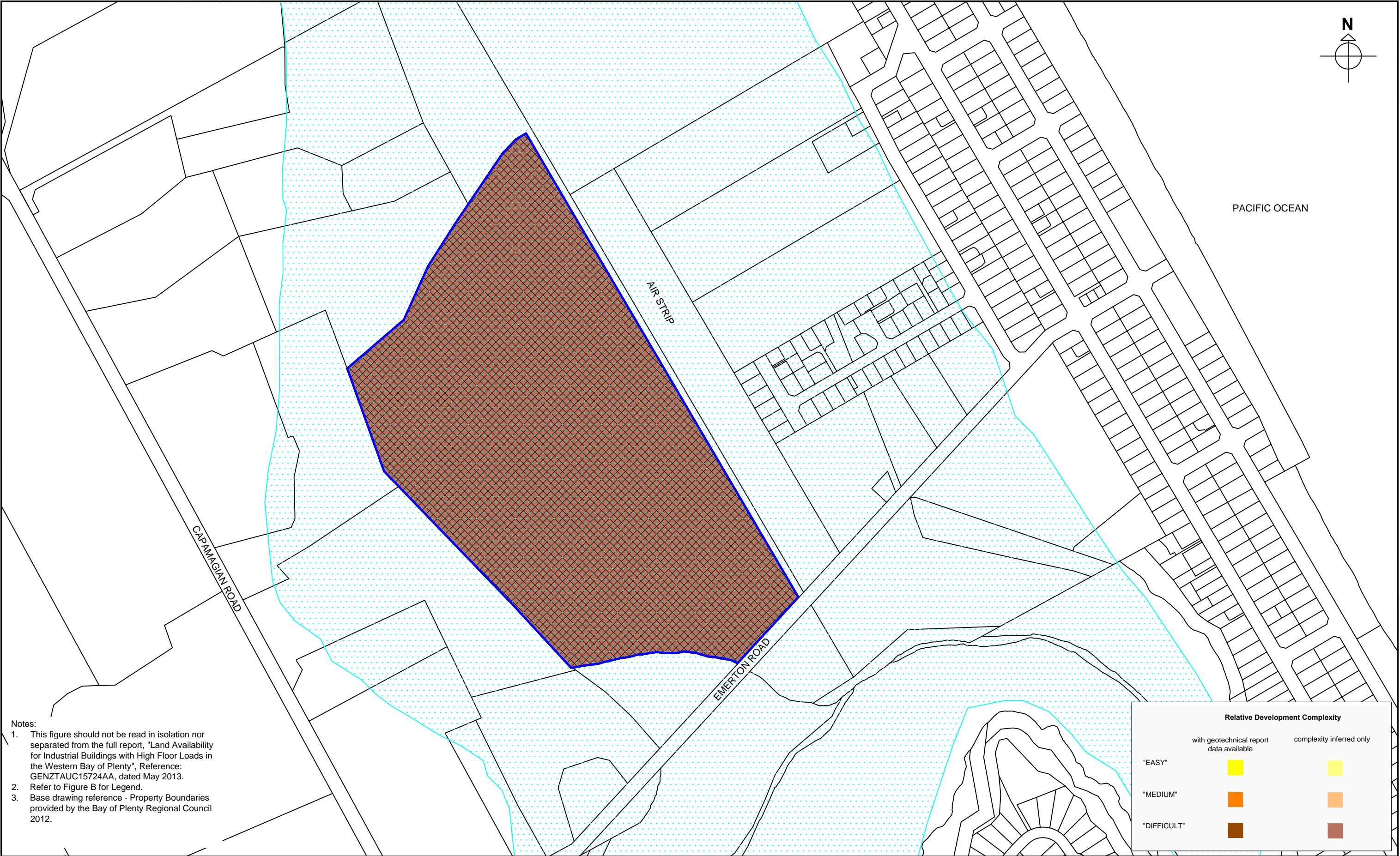
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SMARTGROWTH
HEAVY LOAD BUILDING PROJECT
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LEGEND



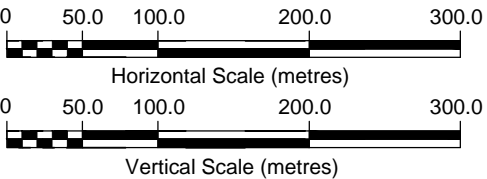
- Notes:
- 1. Figures should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Industrially zoned areas provided by the Bay of Plenty Regional Council. Areas given comprise industrially zoned land in the Operative District Plans for both Tauranga City Council and Western Bay of Plenty District Council, the "Papamoa East Employment" Zone, and the Te Temu Block referred to as Future Development Land as noted on Figure 16.
 - 3. Future Development Areas are areas identified by Smartgrowth as "Generation 5" land which may be zoned industrial in the near future (Figure 25 and 26 only).
 - 4. Flood zones were provided by the Bay of Plenty Regional Council with minor adjustments made where this did not fit the contour information .
 - 5. Land vacancy for the Tauranga City Council areas is based on the Tauranga City Council Environmental Policy Division, "Tauranga City Industrial Land Survey 2011", TCC ref: 4066530, dated June 2011. Land vacancy for the Western Bay of Plenty Regional Council areas are based on aerial photographs dated between 2010 -2012.
 - 6. For "EASY", "MEDIUM" and "DIFFICULT" definitions refer to the full report," Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 7. For the definition of land excluded from the study refer to the report "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.

revision	rev	description	drawn	approved	date		drawn	KB		client: SMARTGROWTH		
							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title: LEGEND		
							scale	NA		project no: GENZTAUC15724AA figure no: B rev: 0		
							original size	A3				



- Notes:
- 1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Refer to Figure B for Legend.
 - 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

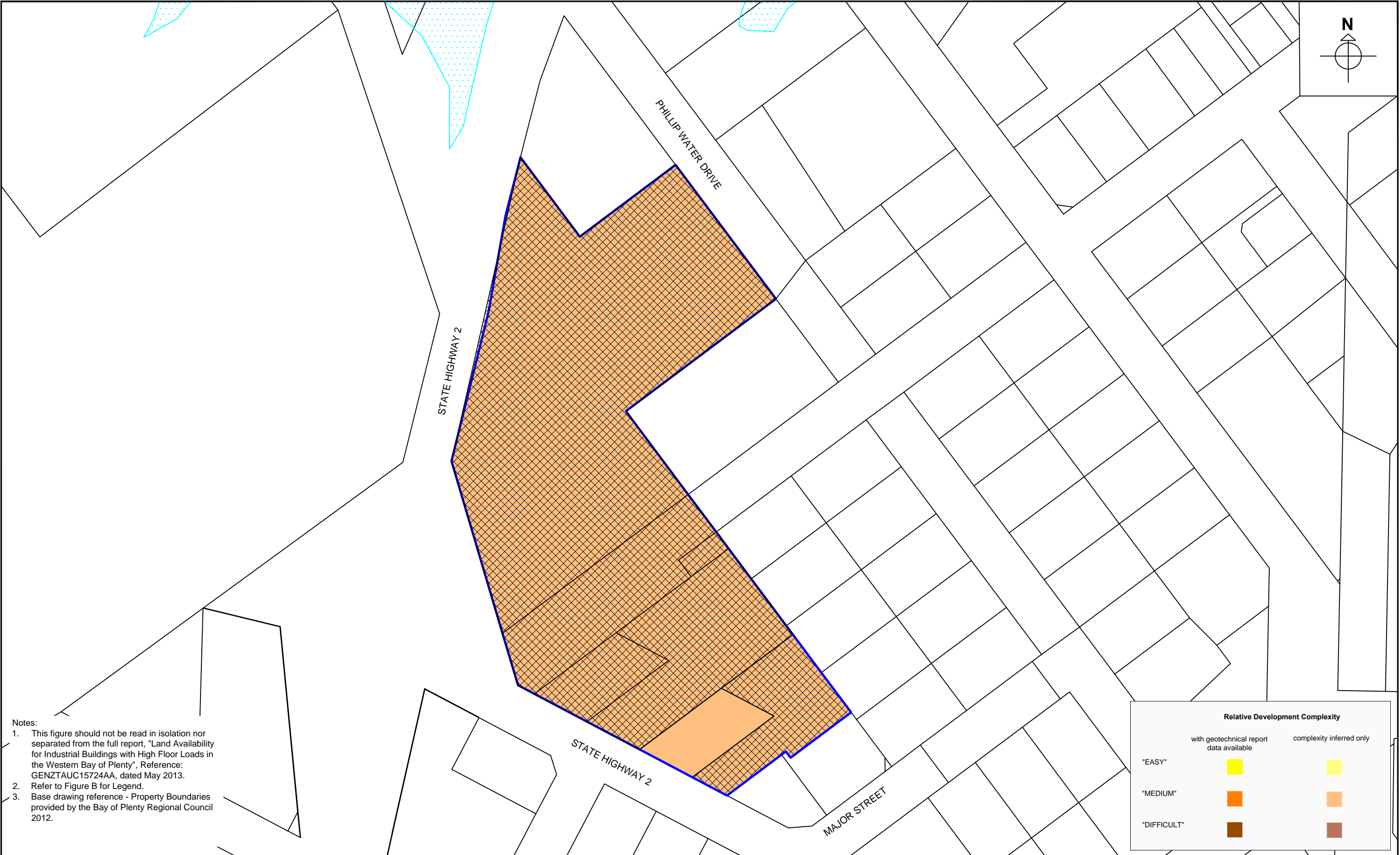
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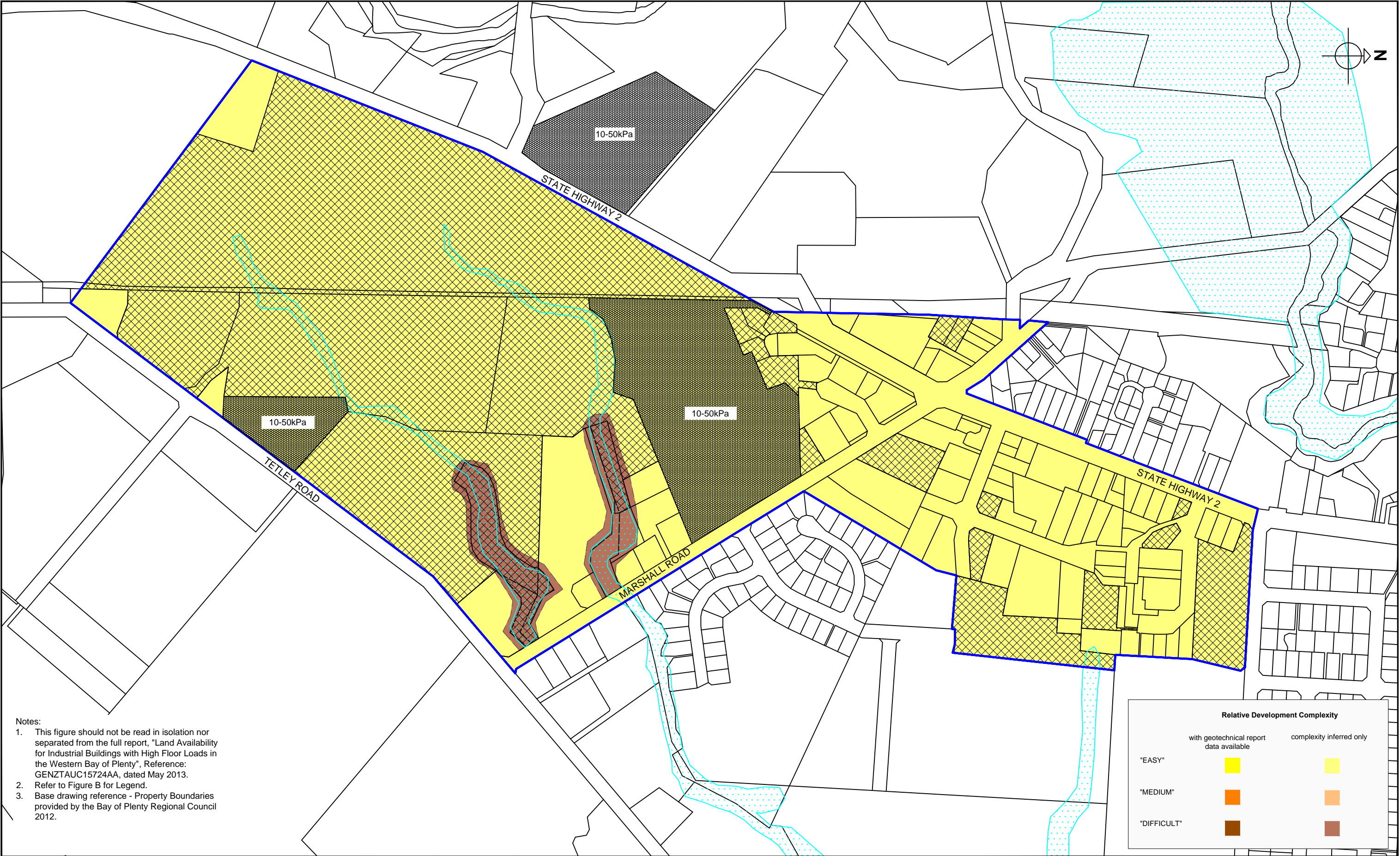
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project no:	GENZTAUC15724AA	figure no:	1
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Notes:

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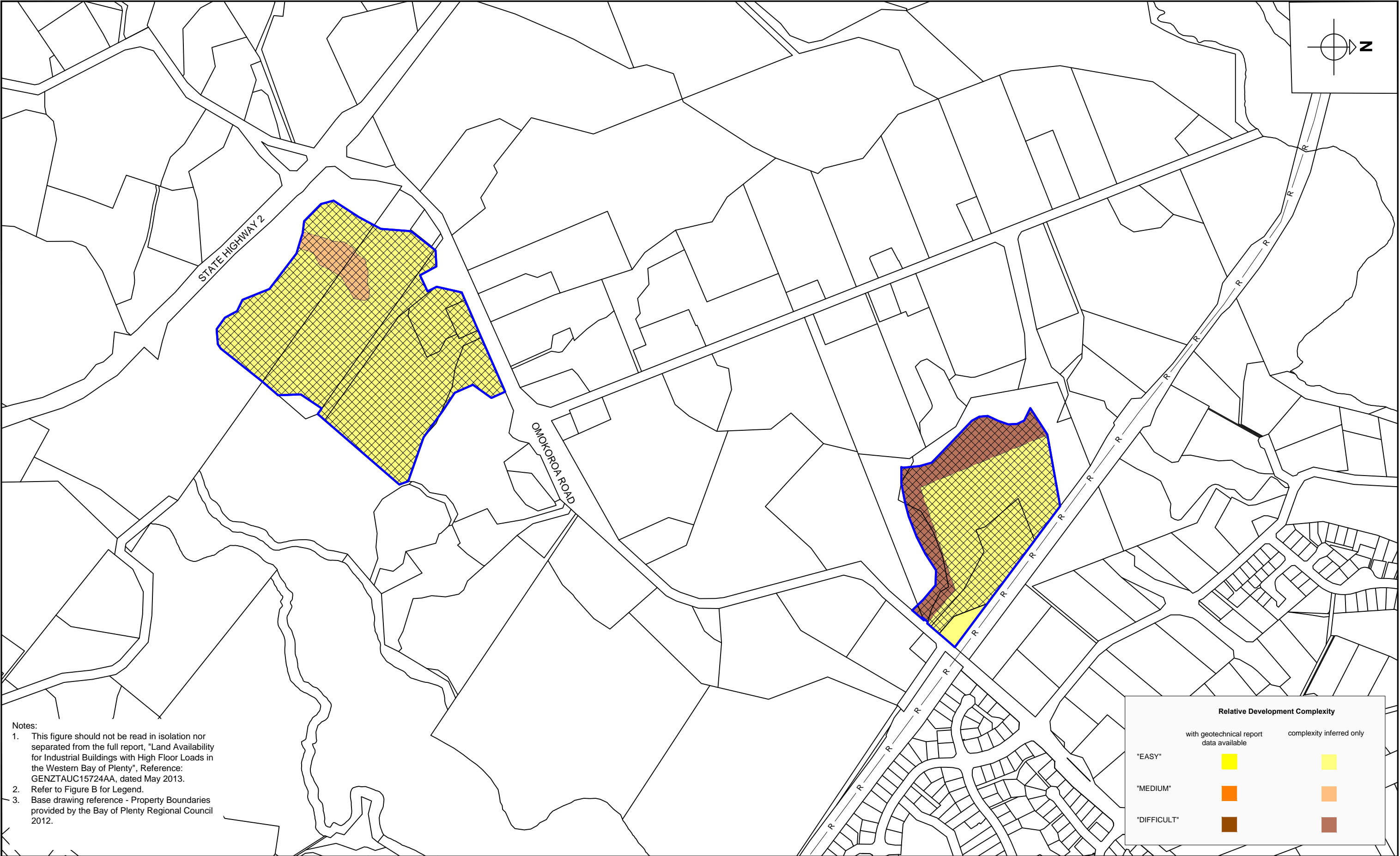
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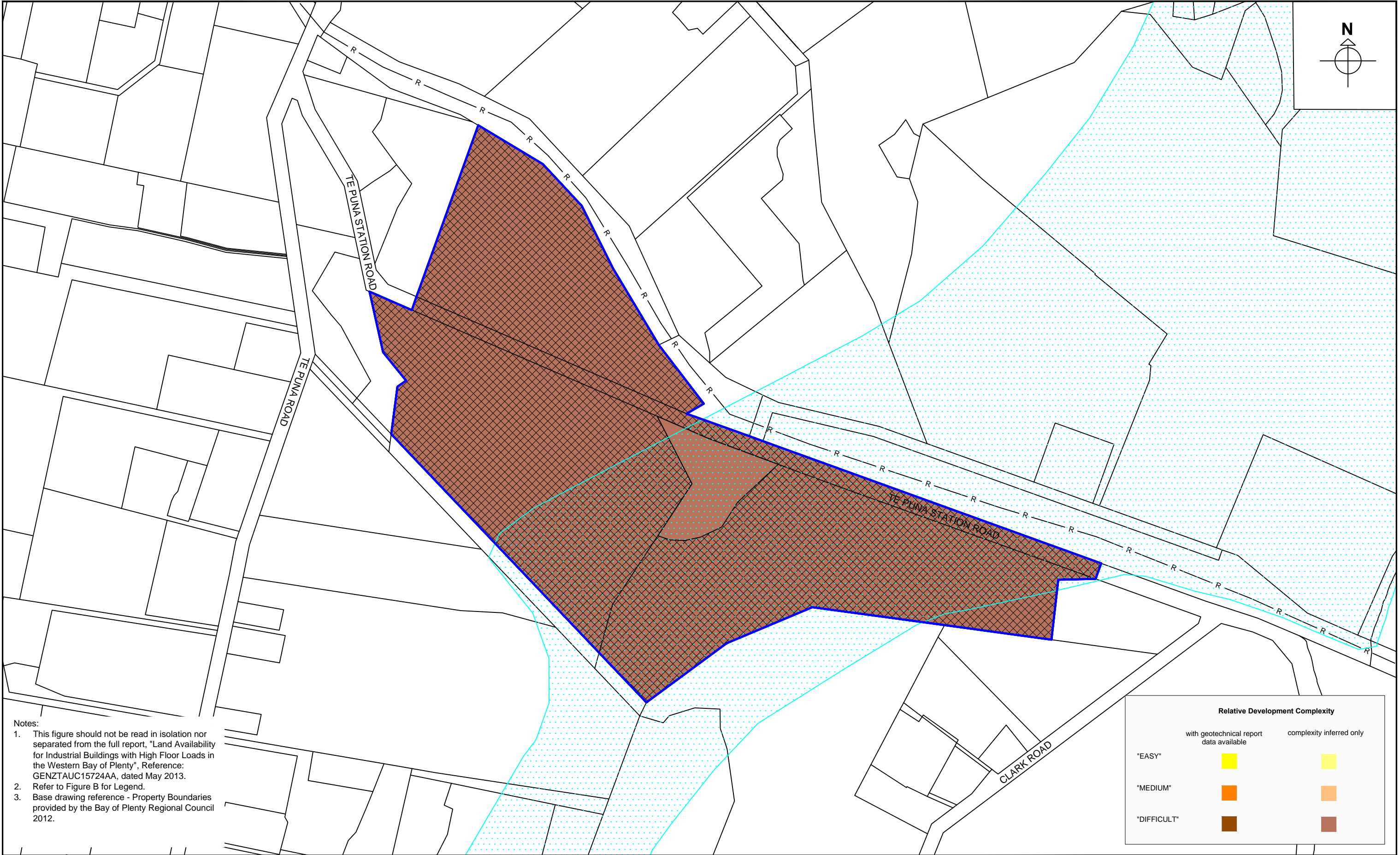
Relative Development Complexity	
with geotechnical report data available	complexity inferred only
"EASY"	
"MEDIUM"	
"DIFFICULT"	

revision	rev	description	drawn	approved	date	<div>0 50.0 100.0 200.0 300.0</div> <div>Horizontal Scale (metres)</div> <div>0 50.0 100.0 200.0 300.0</div> <div>Vertical Scale (metres)</div>	drawn	KB	<div>coffey</div> <div>geotechnics</div> <div>SPECIALISTS MANAGING THE EARTH</div>	client:	SMARTGROWTH		
							approved	SVH		project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title:	KATIKATI SOUTH, WBOPDC		
							scale	1:5,000		project no:	GENZTAUC15724AA	figure no:	3
							original size	A3		rev:	0		



- Notes:
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 2. Refer to Figure B for Legend.
 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

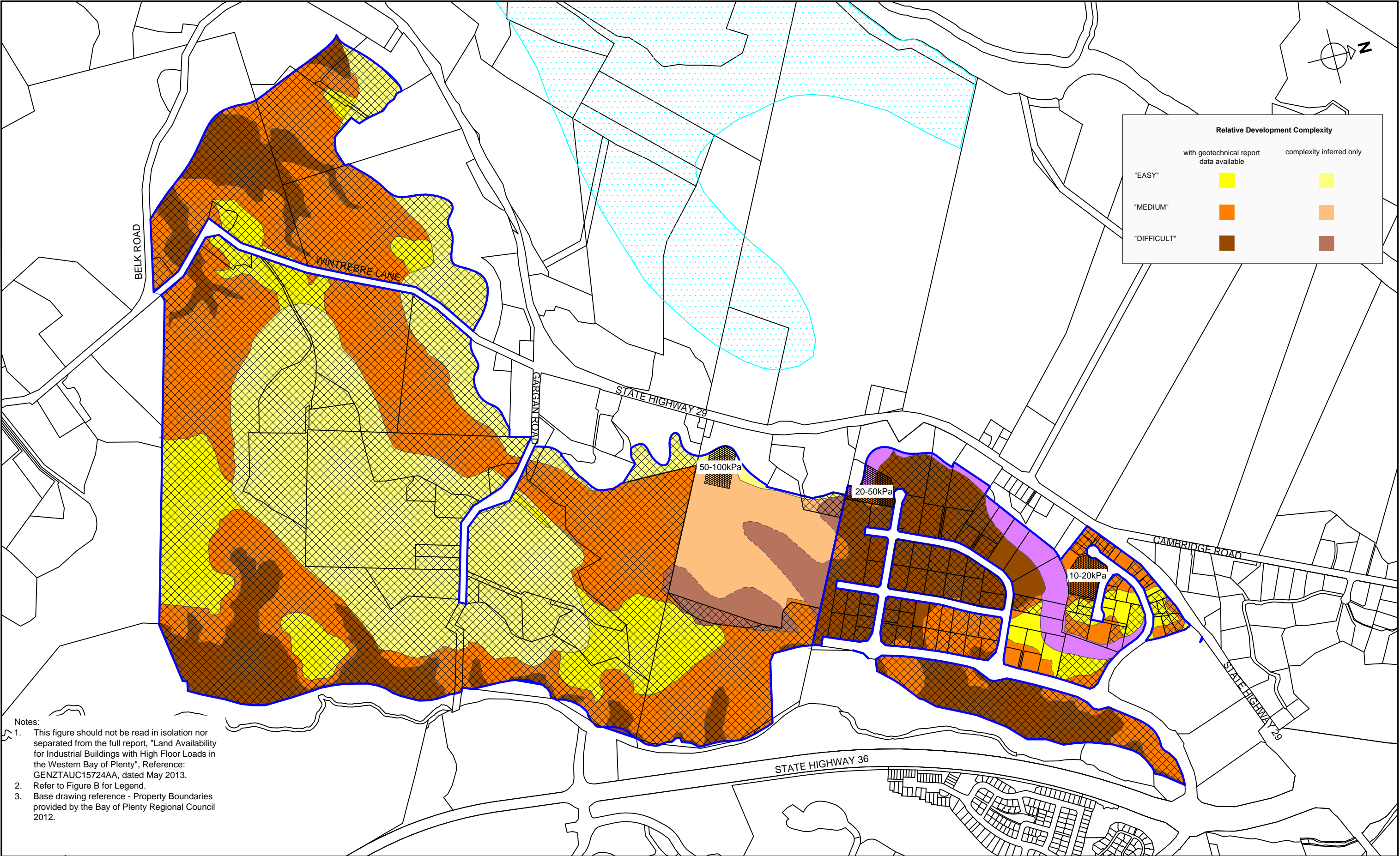
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							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title: OMOKOROA, WBOPDC		
							scale	1:7,500		project no: GENZTAUC15724AAfigure no: 4rev: 0		
							original size	A3				



Notes:

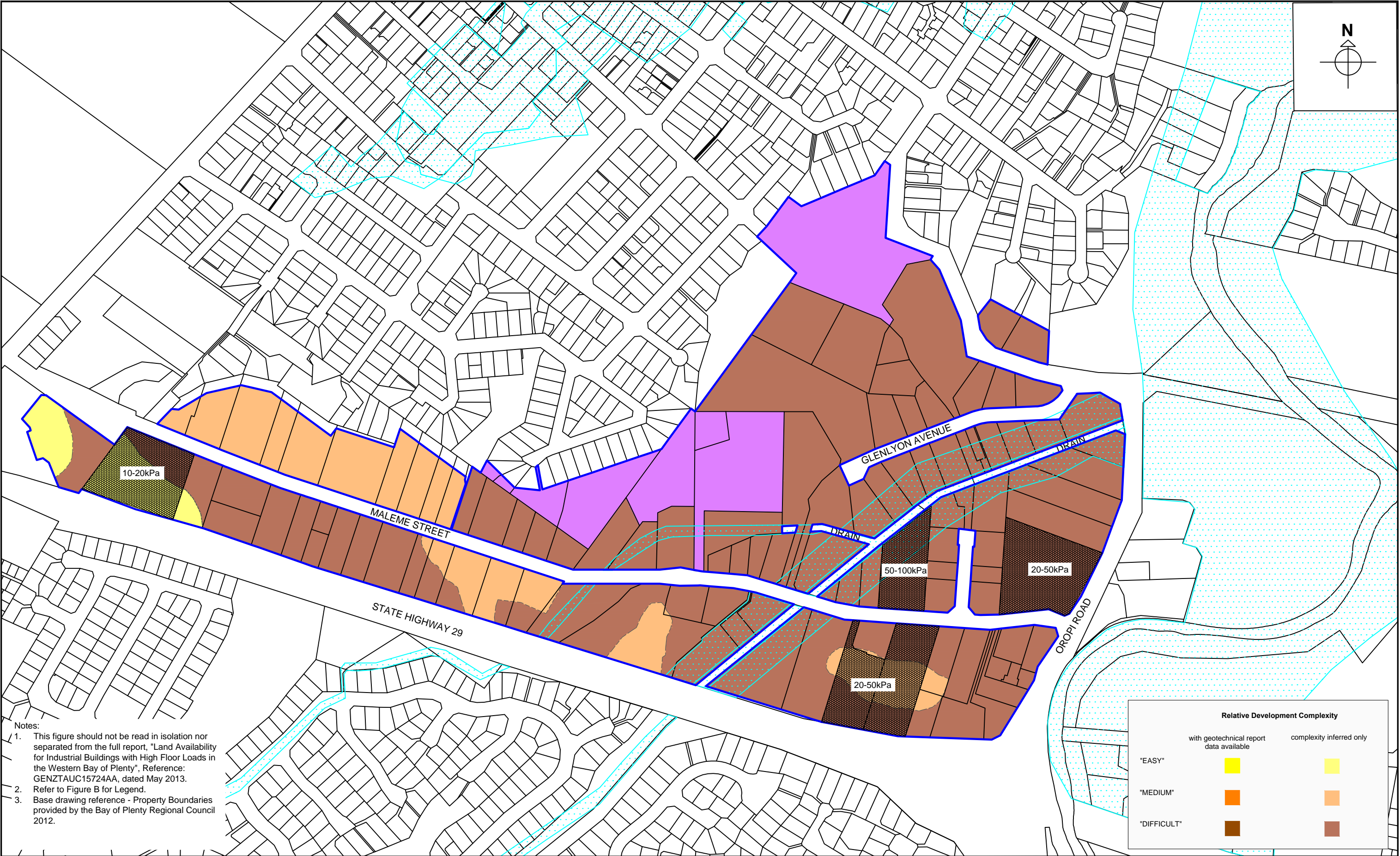
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
2. Refer to Figure B for Legend.
3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

revision	rev	description	drawn	approved	date	<div><div><div>050.0100.0200.0300.0</div><div>Horizontal Scale (metres)</div></div><div><div>050.0100.0200.0300.0</div><div>Vertical Scale (metres)</div></div></div>	drawn	KB	<div><div><div>coffey</div><div>geotechnics</div><div>SPECIALISTS MANAGING THE EARTH</div></div><div><div></div></div></div>	client: SMARTGROWTH			
							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT			
							date	01/05/2013		title: TE PUNA STATION ROAD, WBOPDC			
							scale	1:5,000		project no: GENZTAUC15724AA		figure no: 5	rev: 0
							original size	A3					



- Notes:
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 2. Refer to Figure B for Legend.
 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

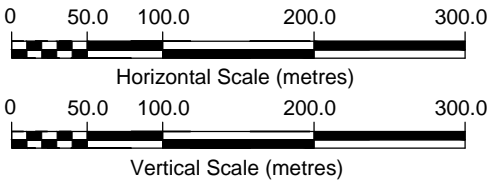
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							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title: TAURIKO, TAURANGA		
							scale	1:10,000		project no: GENZTAUC15724AAfigure no: 6rev: 0		
							original size	A3				



- Notes:
- 1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Refer to Figure B for Legend.
 - 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

Relative Development Complexity		
	with geotechnical report data available	complexity inferred only
"EASY"		
"MEDIUM"		
"DIFFICULT"		

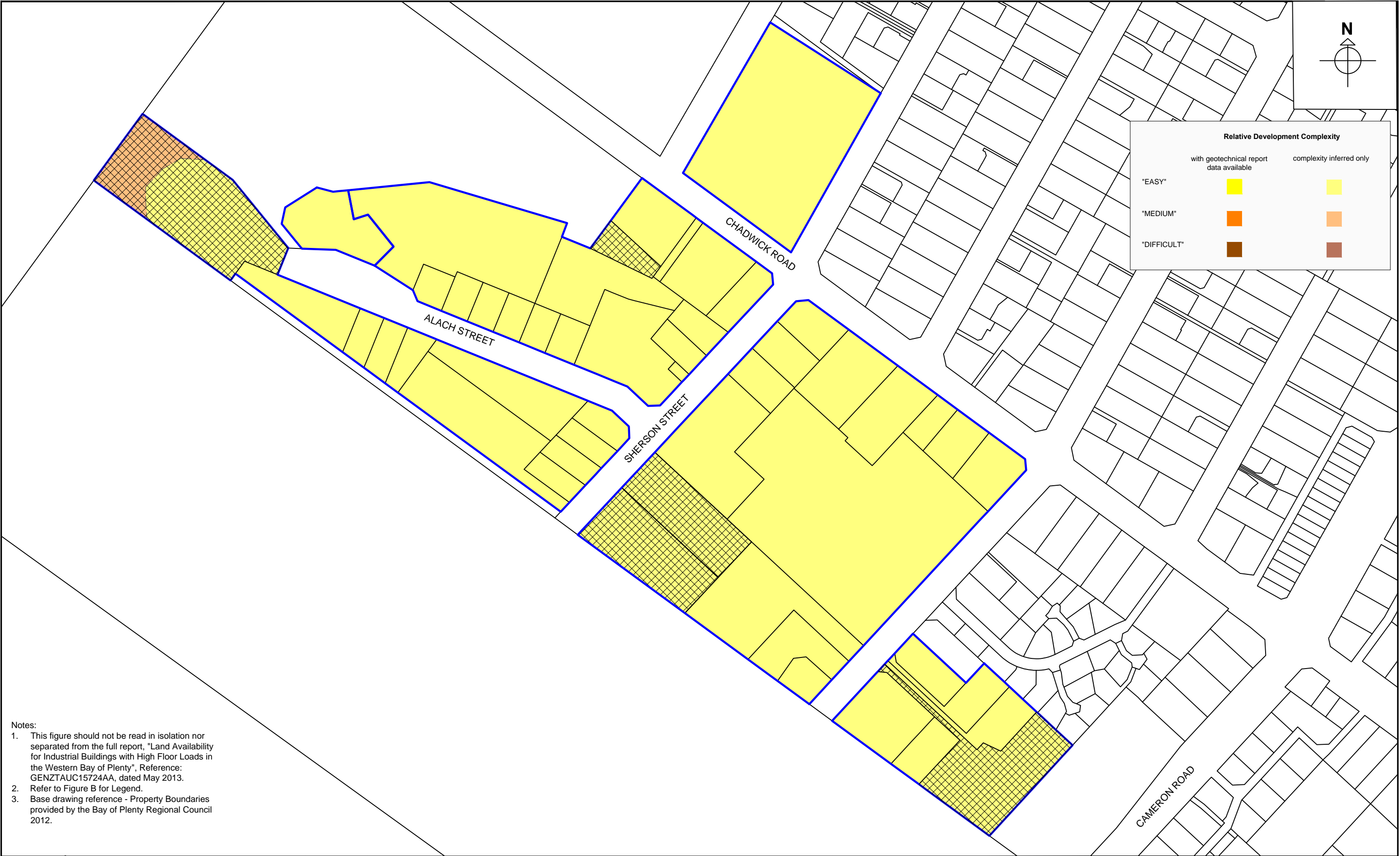
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drawn	KB
approved	SVH
date	01/05/2013
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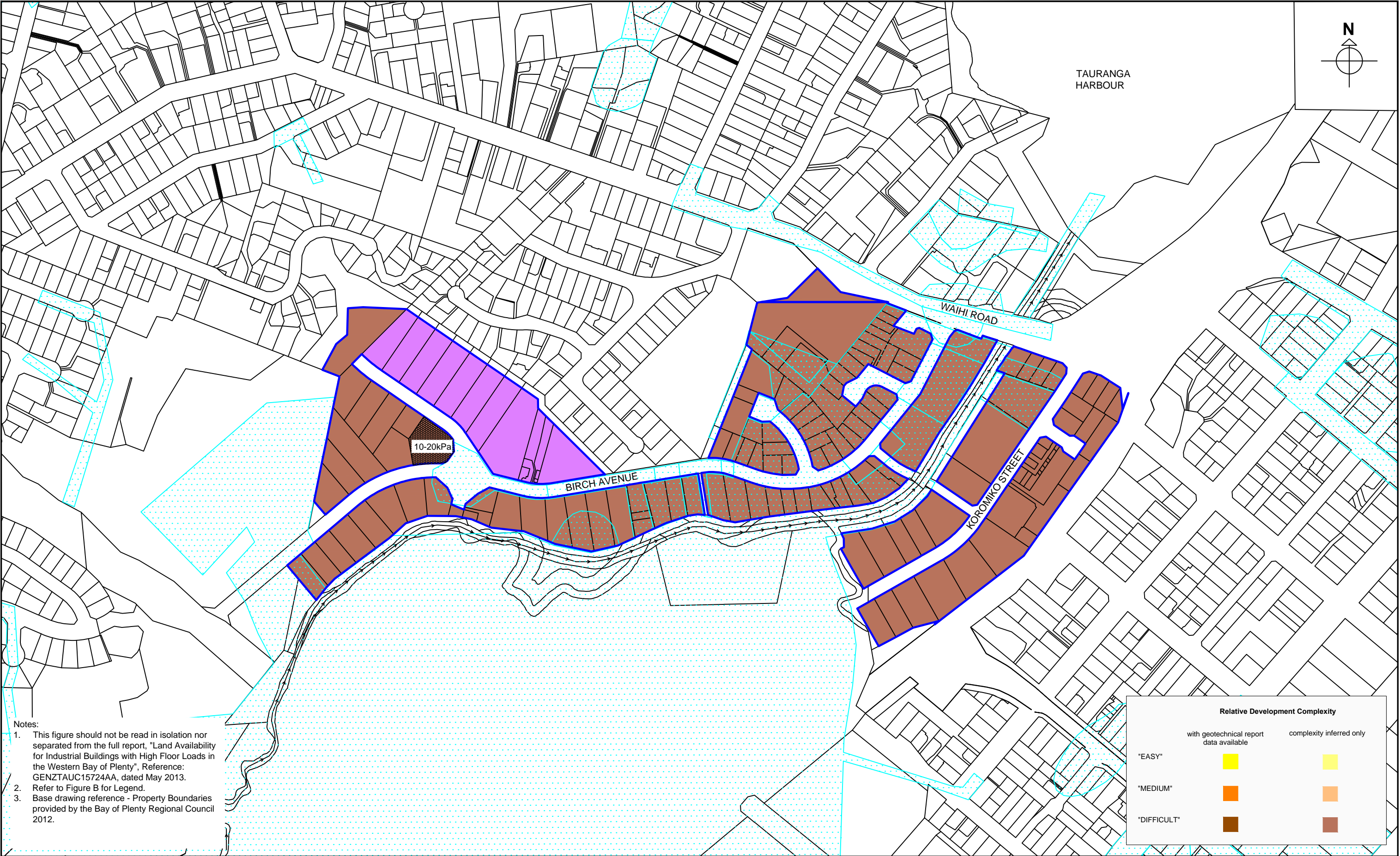


client:	SMARTGROWTH		
project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
title:	MALEME STREET, TAURANGA		
project no:	GENZTAUC15724AA	figure no:	7
rev:	0		



- Notes:
- 1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Refer to Figure B for Legend.
 - 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

revision	rev	description	drawn	approved	date	<div><div>0150300450</div><div>Horizontal Scale (metres)</div><div>0150300450</div><div>Vertical Scale (metres)</div></div>	drawn	KB	<div><div>coffey</div><div>geotechnics</div><div>SPECIALISTS MANAGING THE EARTH</div></div>	client: SMARTGROWTH		
							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title: GREERTON, TAURANGA		
							scale	1:2,500		project no: GENZTAUC15724AAfigure no: 8rev: 0		
							original size	A3				



Notes:

1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
2. Refer to Figure B for Legend.
3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

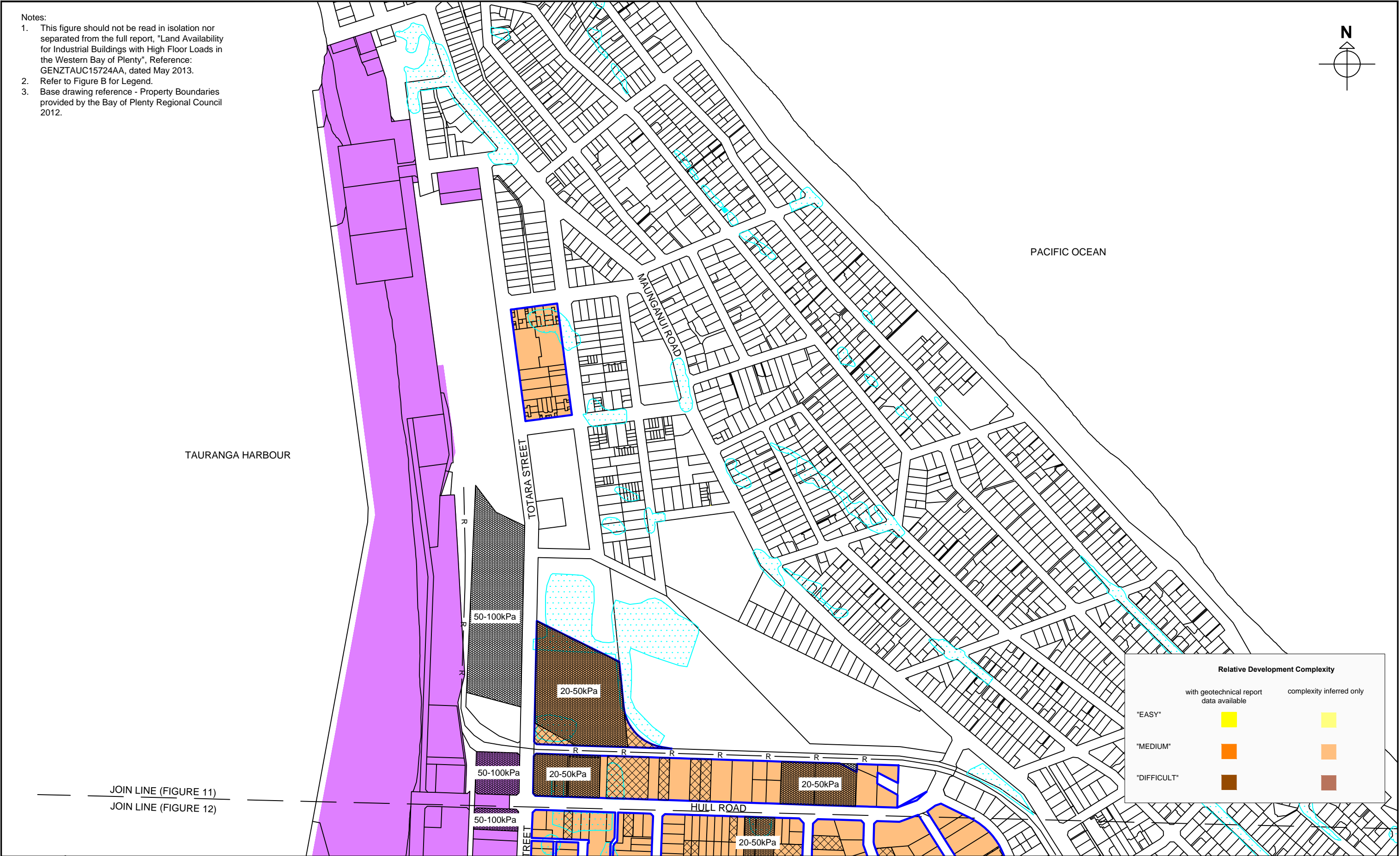
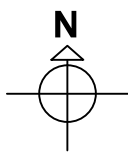
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							date	01/05/2013		title: JUDEA, TAURANGA		
							scale	1:5,000		project no: GENZTAUC15724AAfigure no: 9rev: 0		
							original size	A3				



- Notes:
- 1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Refer to Figure B for Legend.
 - 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

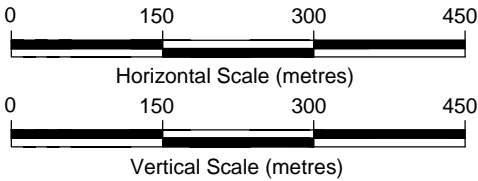
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							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title: SULPHUR POINT, TAURANGA		
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- Notes:
- 1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Refer to Figure B for Legend.
 - 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.



JOIN LINE (FIGURE 11)
JOIN LINE (FIGURE 12)

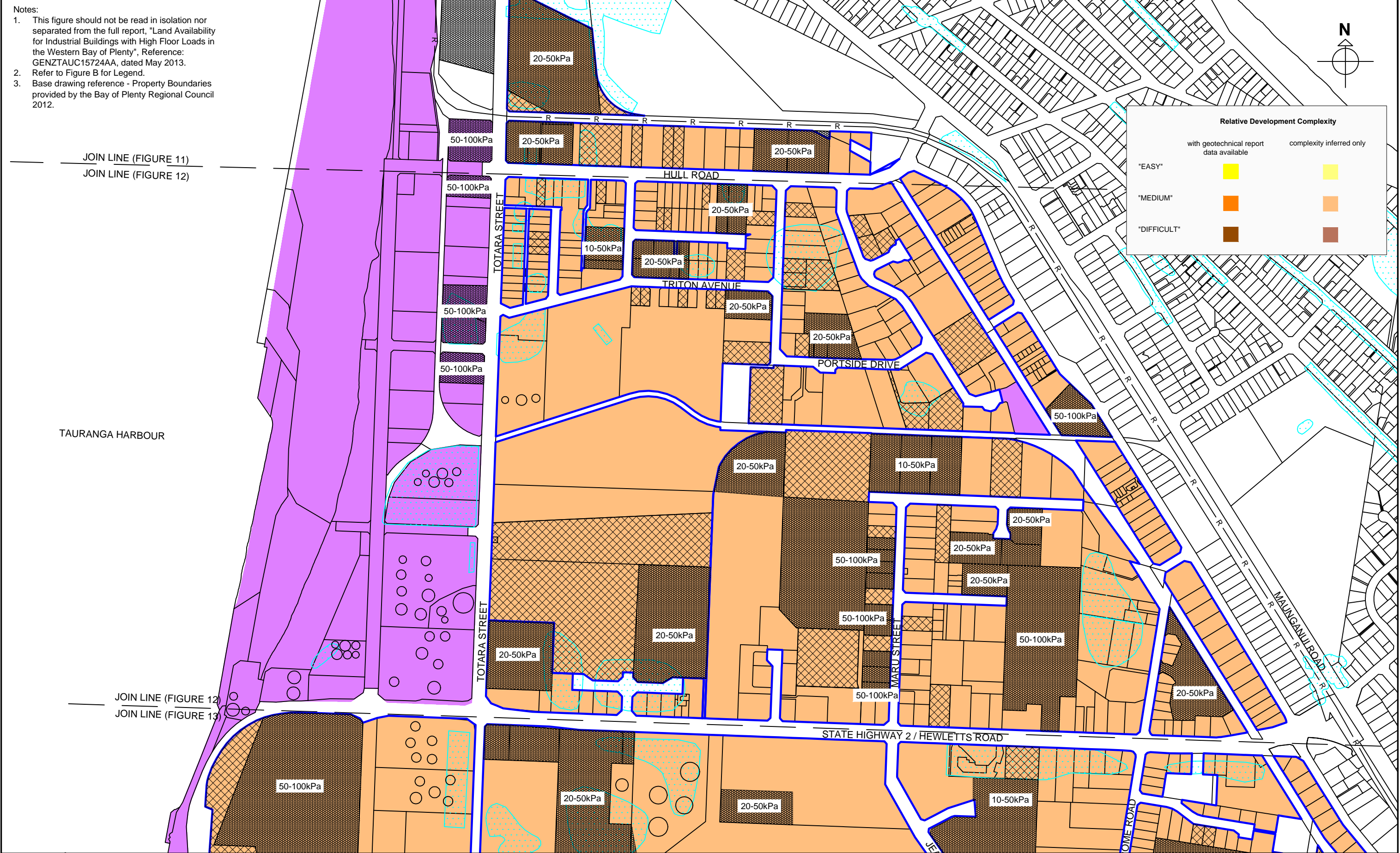
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drawn	KB
approved	SVH
date	01/05/2013
scale	1:7,500
original size	A3

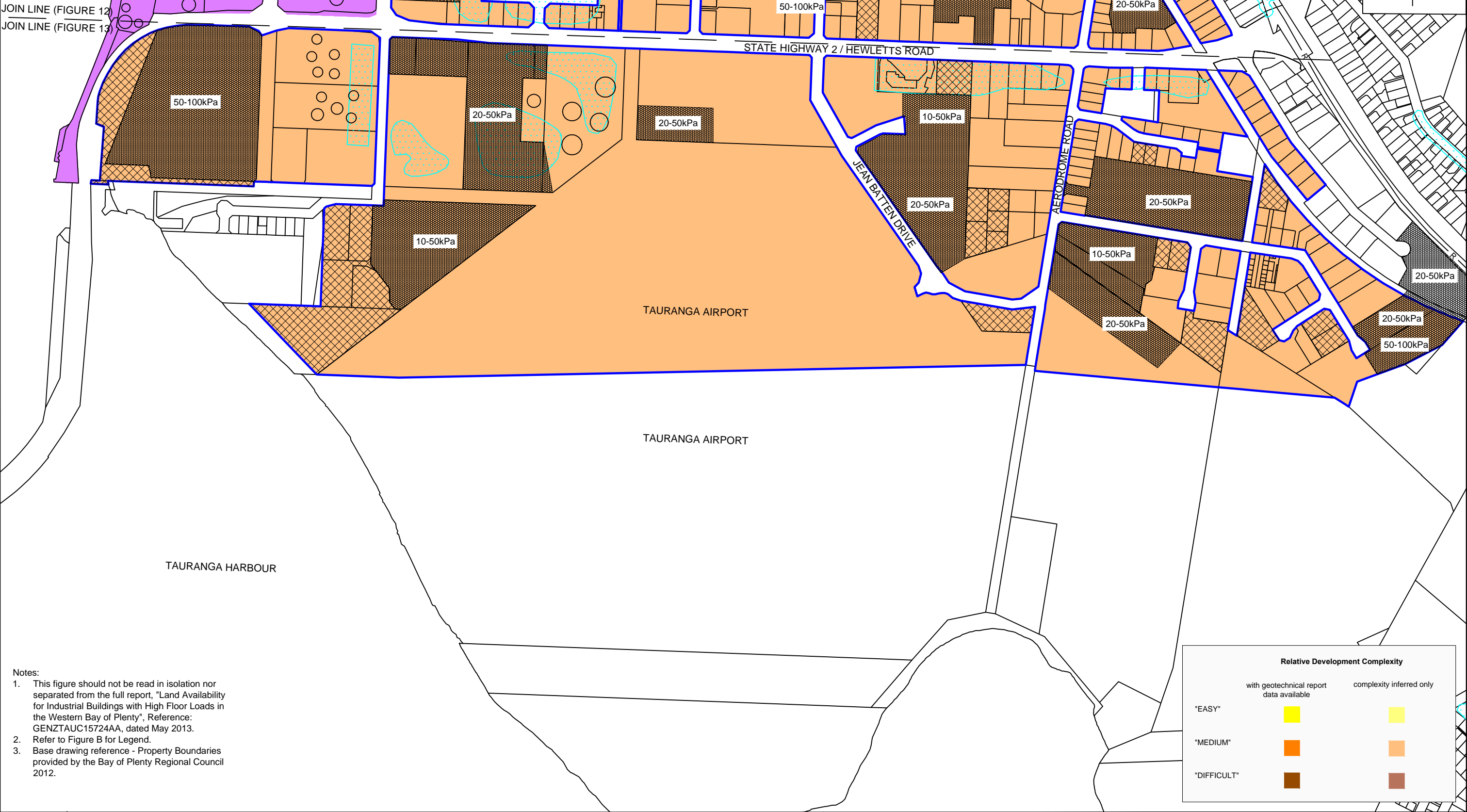


client:	SMARTGROWTH		
project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
title:	MOUNT MAUNGANUI NORTH		
project no:	GENZTAUC15724AA	figure no:	11
		rev:	0



revision	rev	description	drawn	approved	date	<div><div>0150300450</div><div>Horizontal Scale (metres)</div><div>0150300450</div><div>Vertical Scale (metres)</div></div>	drawn	KB	<div><div>coffey</div><div>geotechnics</div><div>SPECIALISTS MANAGING THE EARTH</div></div>	client: SMARTGROWTH		
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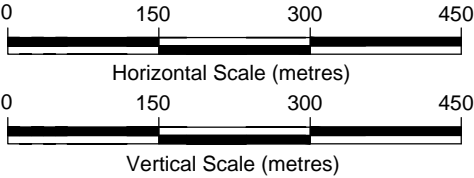
JOIN LINE (FIGURE 12)
JOIN LINE (FIGURE 13)



- Notes:
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 2. Refer to Figure B for Legend.
 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

Relative Development Complexity		
	with geotechnical report data available	complexity inferred only
"EASY"		
"MEDIUM"		
"DIFFICULT"		

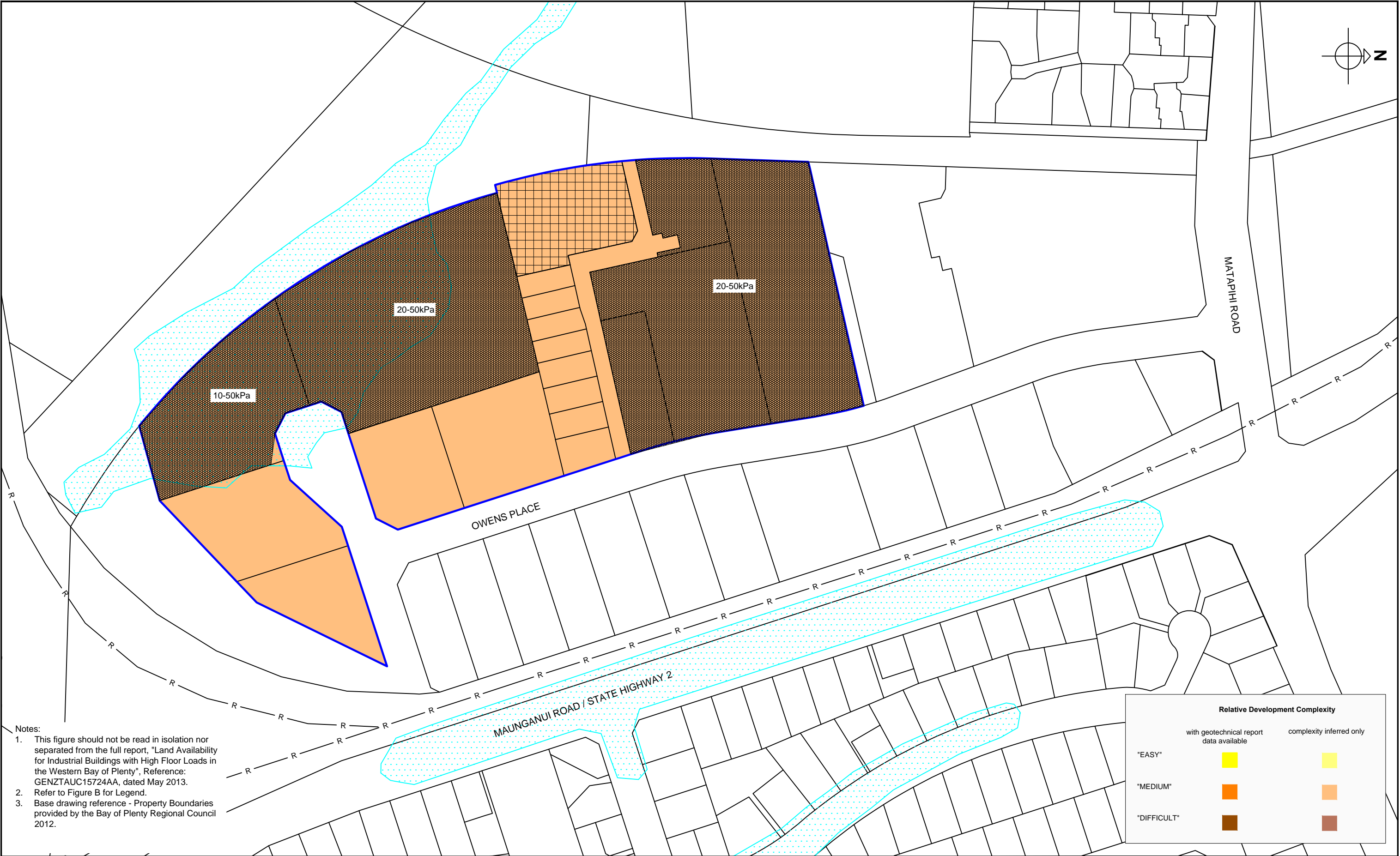
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drawn	KB
approved	SVH
date	01/05/2013
scale	1:7,500
original size	A3

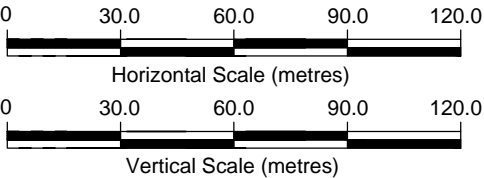


client:	SMARTGROWTH		
project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
title:	MOUNT MAUNGANUI SOUTH		
project no:	GENZTAUC15724AA	figure no:	13
		rev:	0



- Notes:
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 2. Refer to Figure B for Legend.
 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

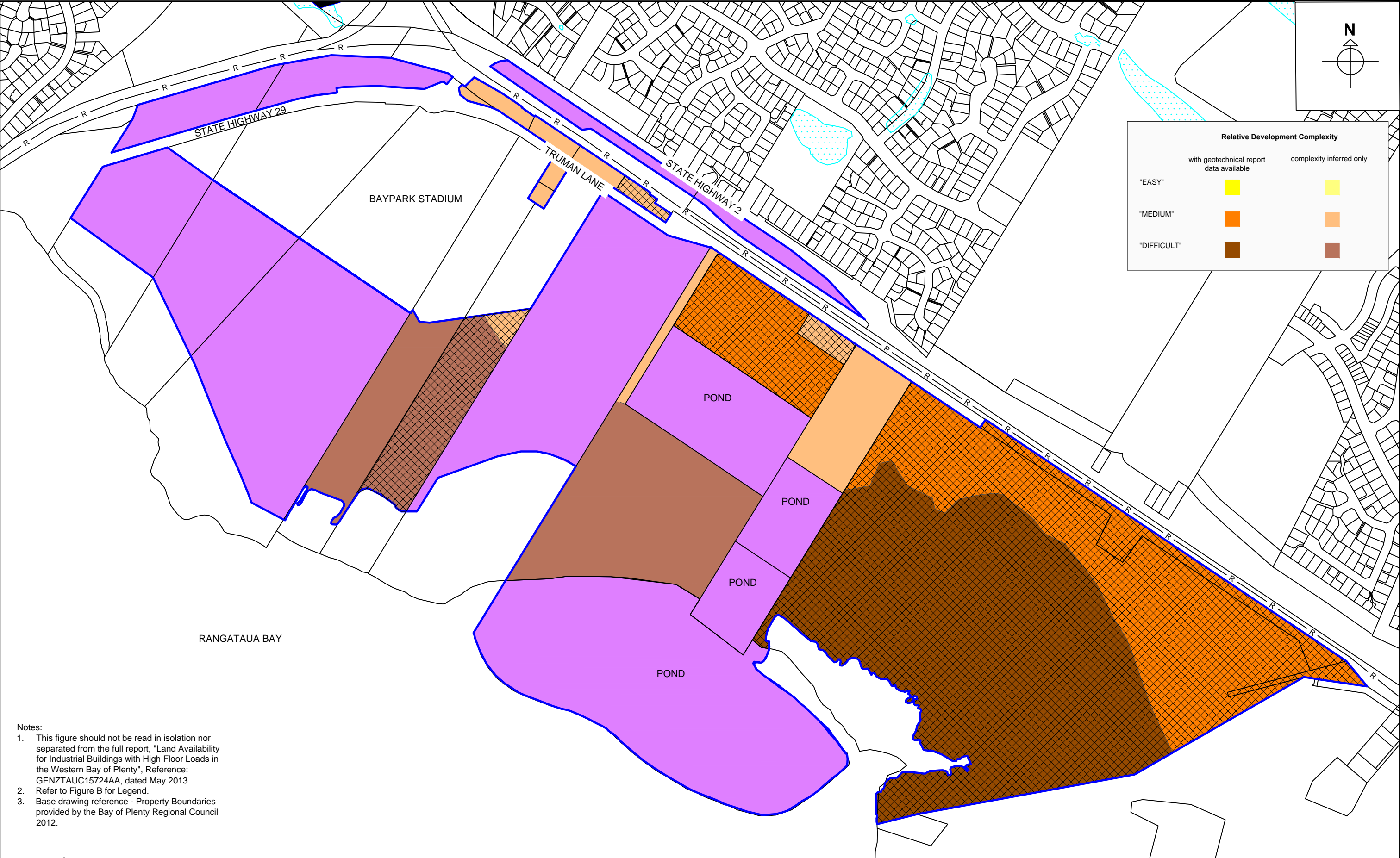
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drawn	KB
approved	SVH
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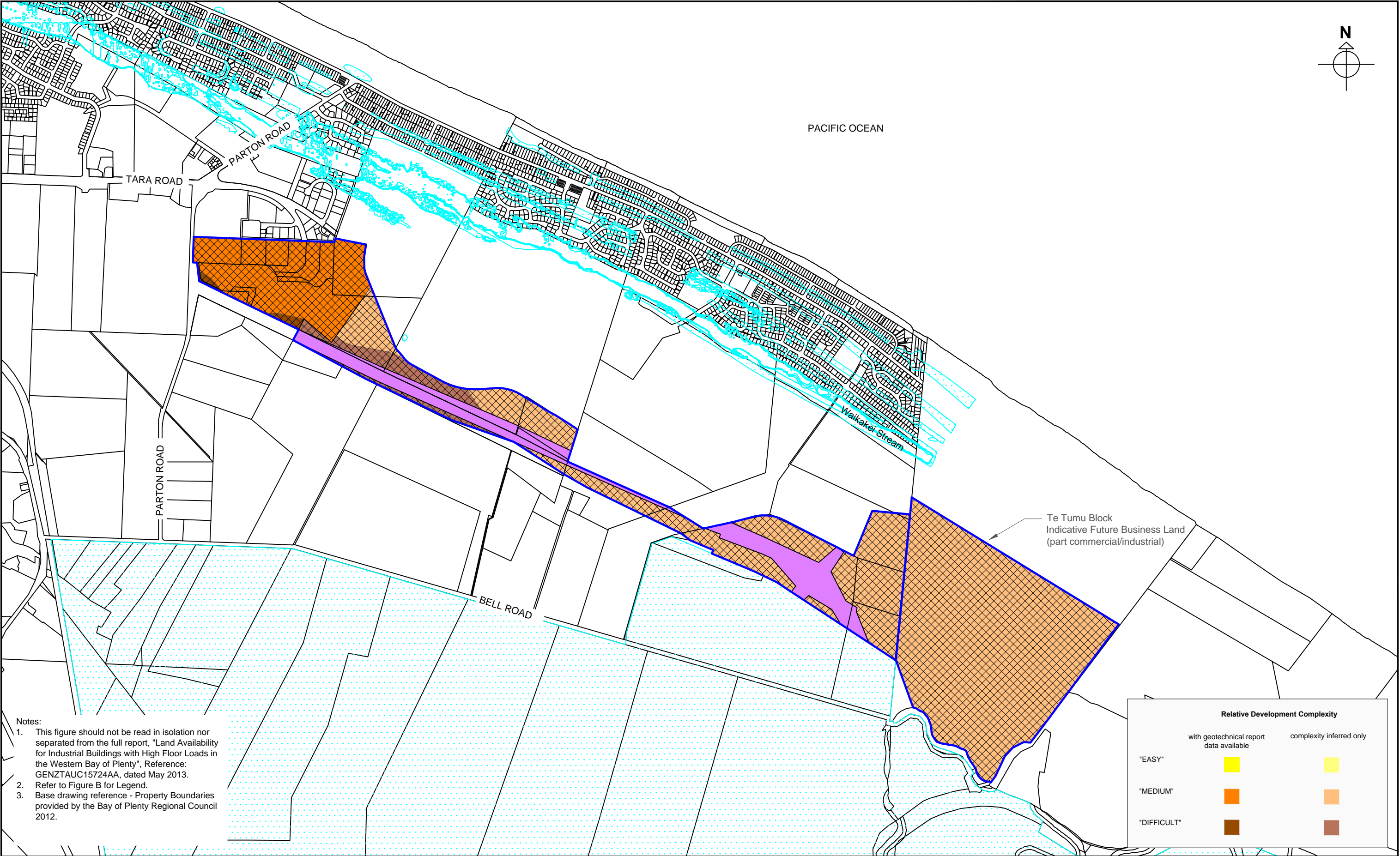


client:	SMARTGROWTH		
project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
title:	OWENS PLACE, TAURANGA		
project no:	GENZTAUC15724AA	figure no:	14
rev:	0		



- Notes:
- 1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Refer to Figure B for Legend.
 - 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

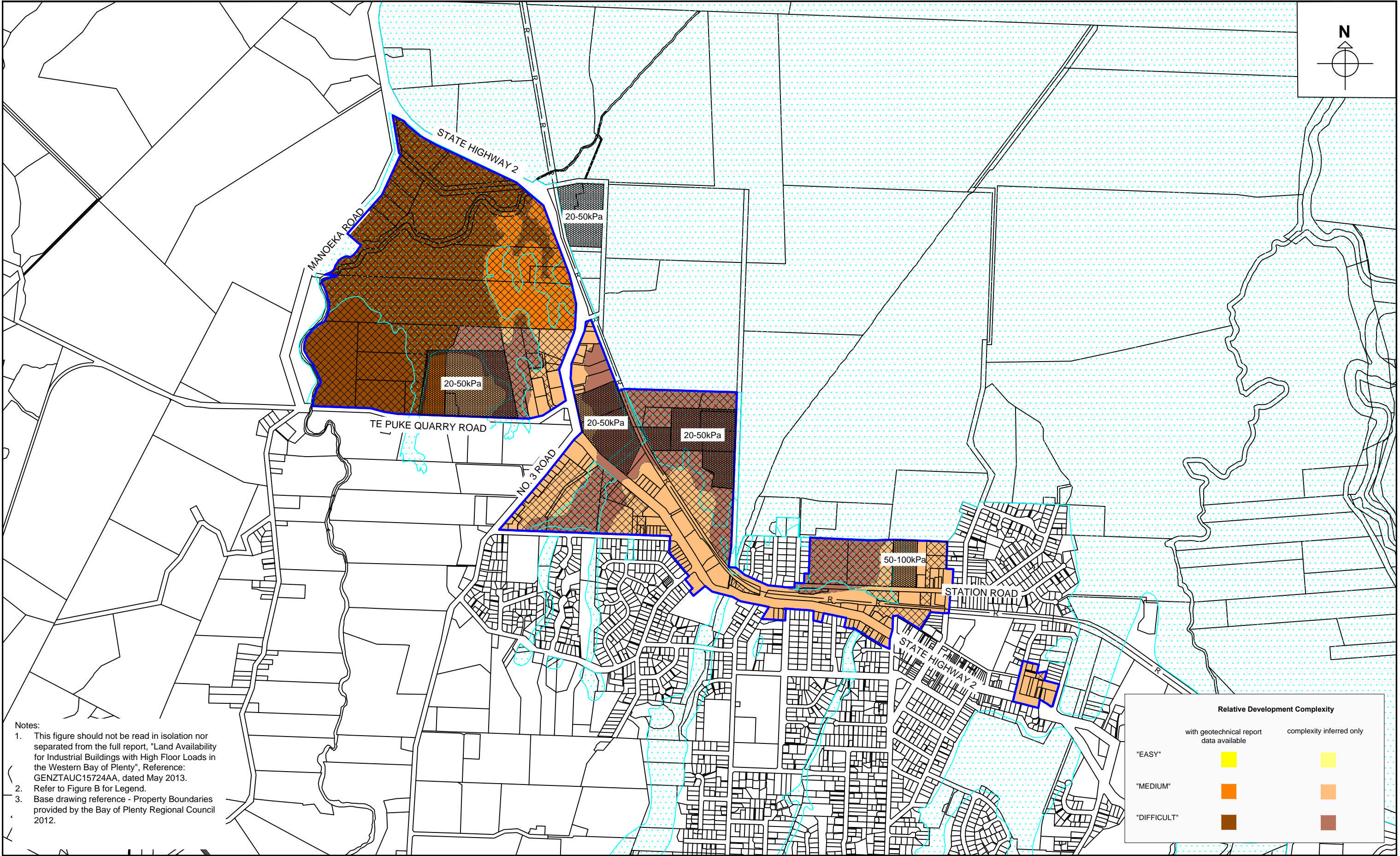
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							original size	A3				



- Notes:
- 1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 2. Refer to Figure B for Legend.
 - 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

Relative Development Complexity		
	with geotechnical report data available	complexity inferred only
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"MEDIUM"	<div></div>	<div></div>
"DIFFICULT"	<div></div>	<div></div>

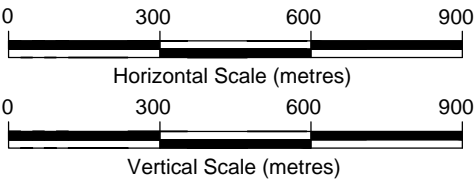
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							date	01/05/2013		title: WAIRAKEI - TE TUMU, PAPAMOA				
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Notes:

1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
2. Refer to Figure B for Legend.
3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

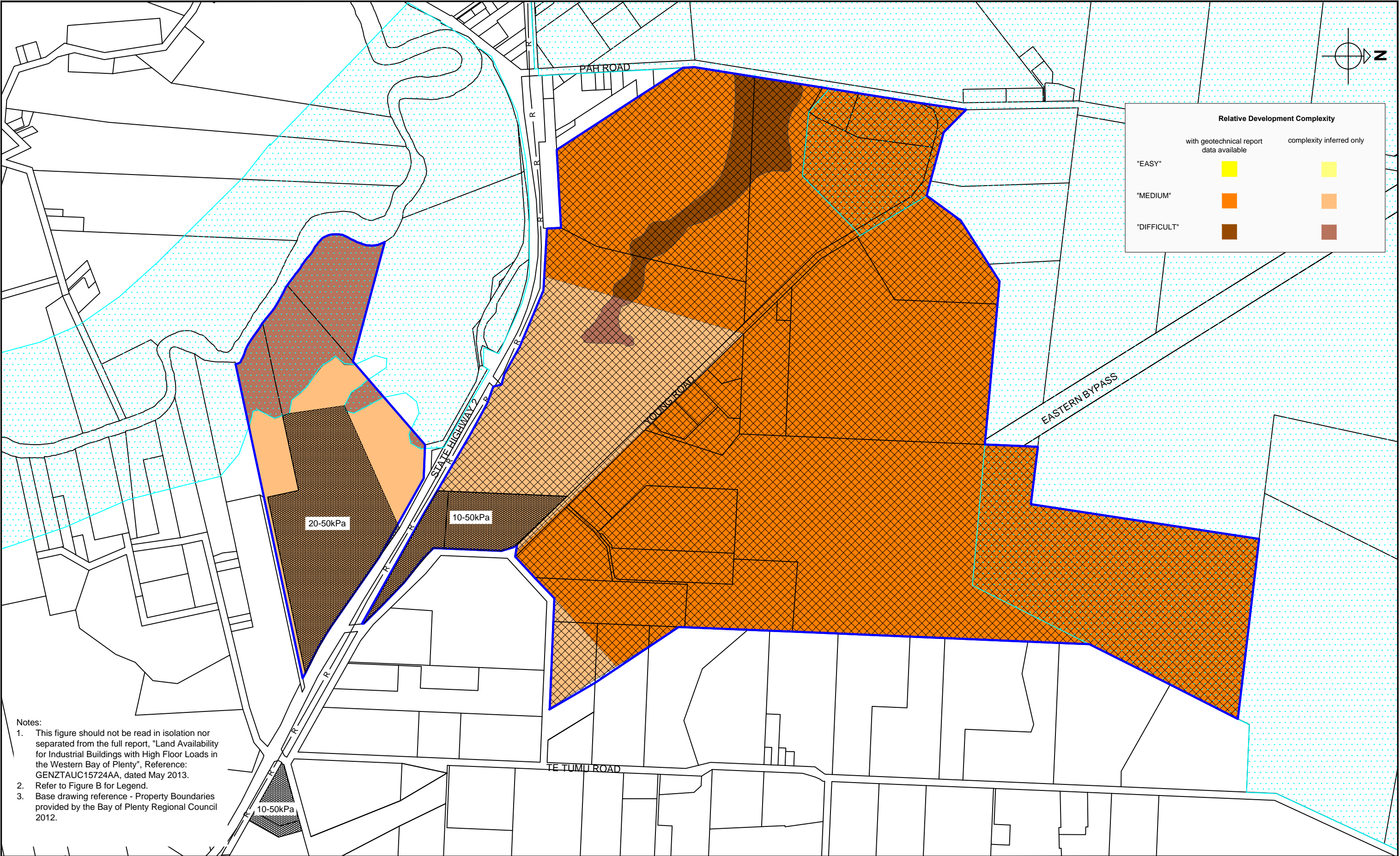
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approved	SVH
date	01/05/2013
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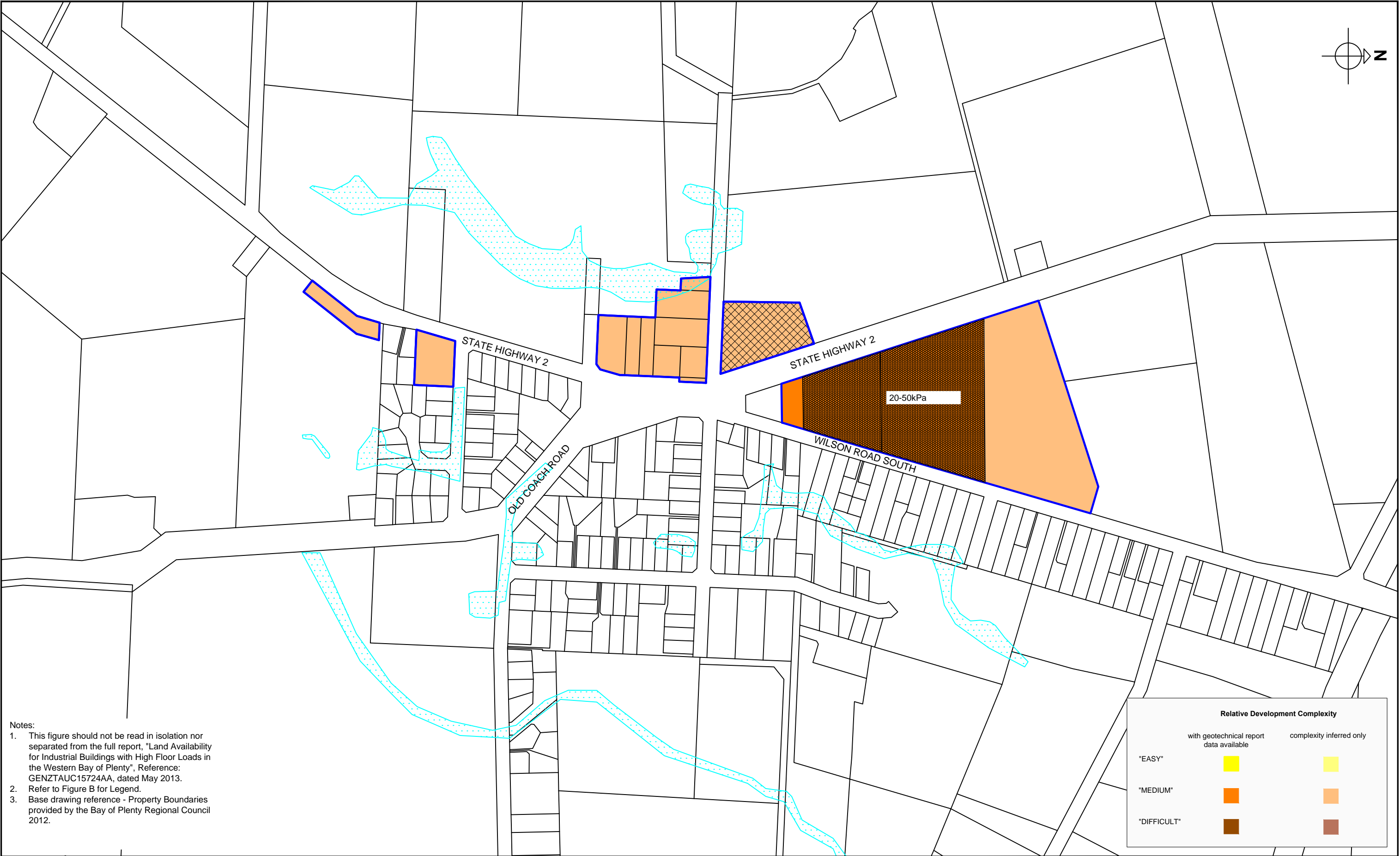


client:	SMARTGROWTH		
project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
title:	TE PUKE, WBOPDC		
project no:	GENZTAUC15724AA	figure no:	17
		rev:	0



- Notes:
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 2. Refer to Figure B for Legend.
 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

revision	rev	description	drawn	approved	date	<div><div><div>0200400600</div><div></div></div><div>Horizontal Scale (metres)</div><div><div>0200400600</div><div></div></div><div>Vertical Scale (metres)</div></div>	drawn	KB	<div><div><div>coffey</div><div>geotechnics</div><div>SPECIALISTS MANAGING THE EARTH</div></div><div><div></div></div></div>	client: SMARTGROWTH		
							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title: RANGIURU, WBOPDC		
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Notes:

1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
2. Refer to Figure B for Legend.
3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

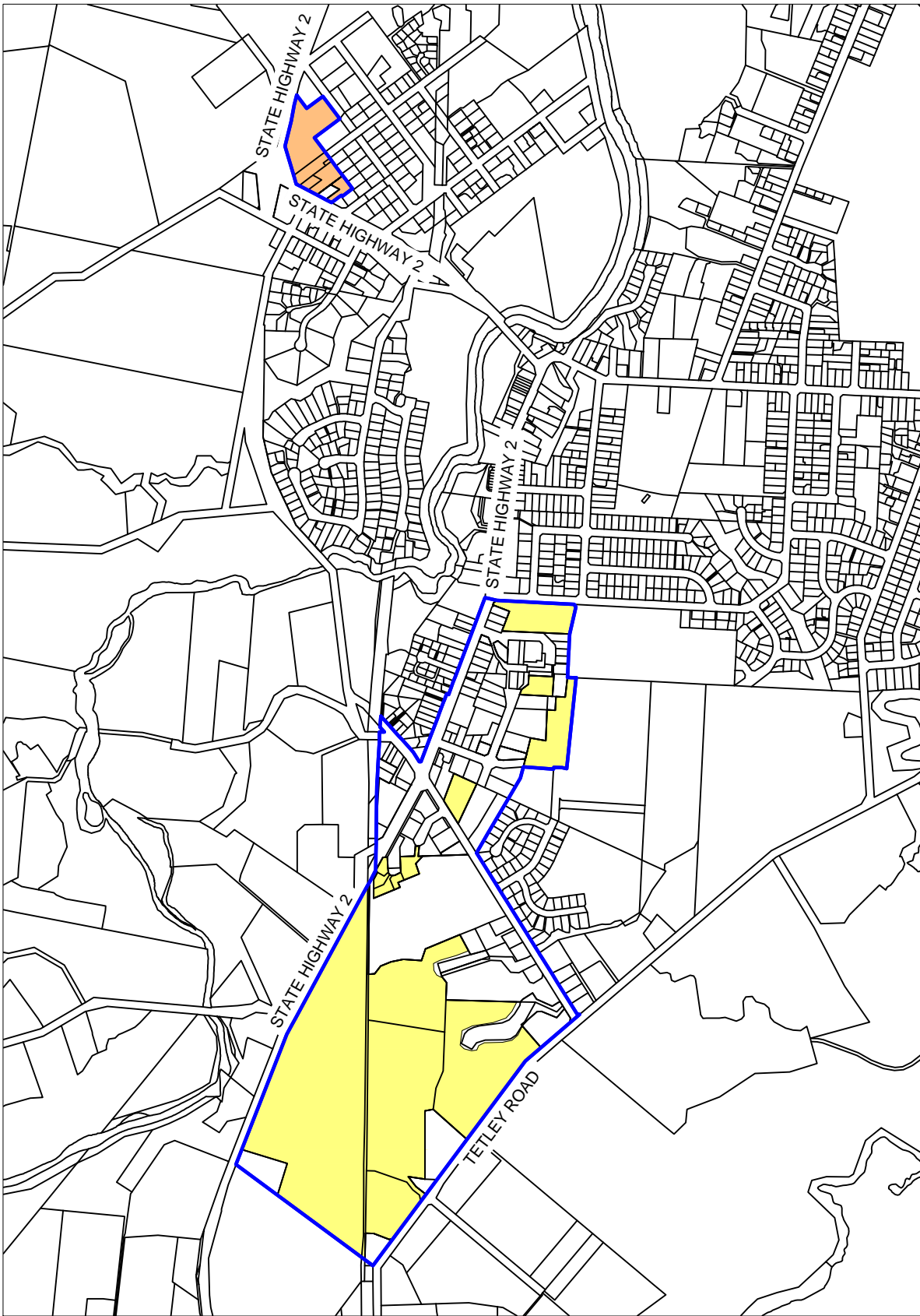
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							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title: PAENGEROA, WBOPDC		
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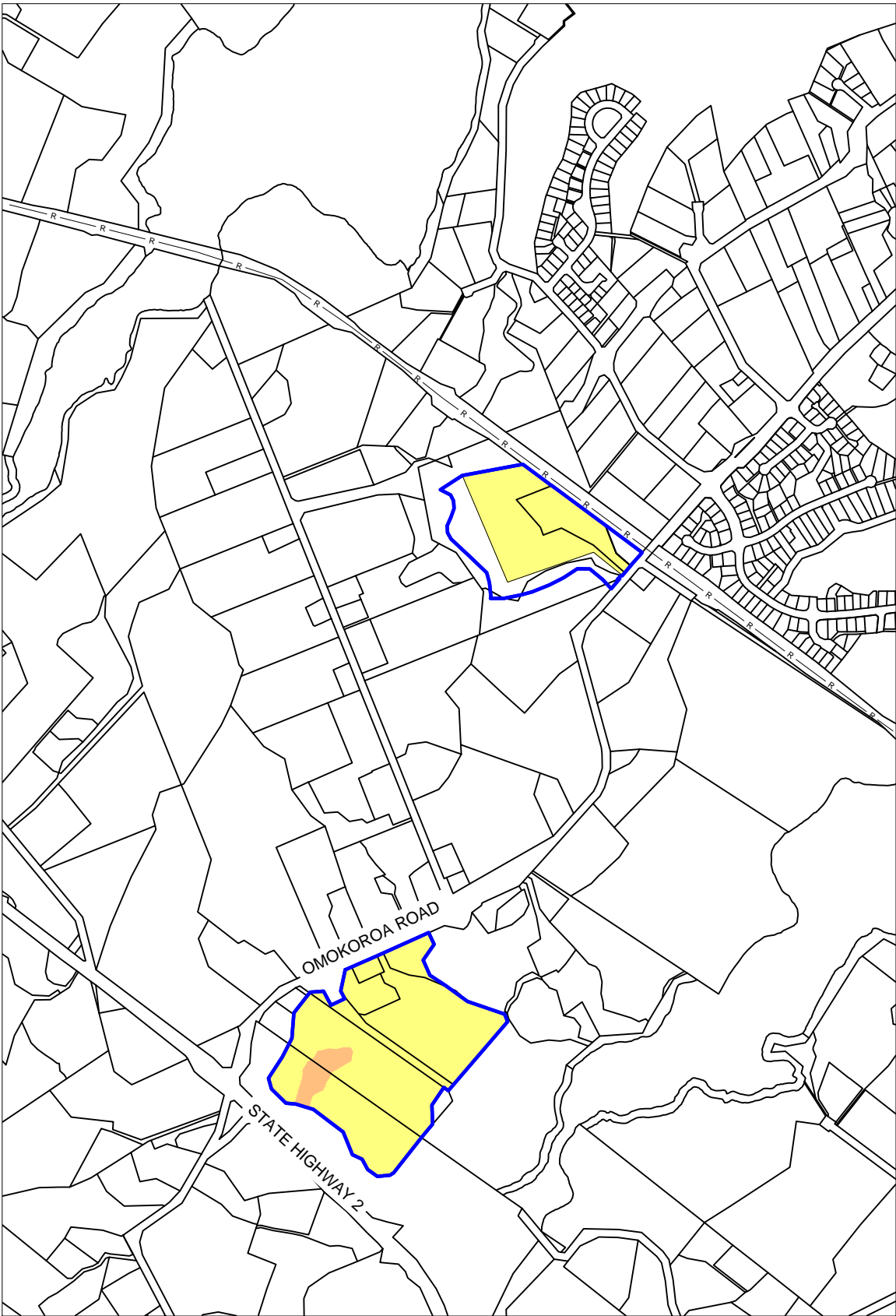
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1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
2. Refer to Figure B for Legend.
3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.

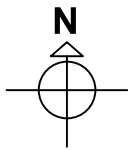
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							date	01/05/2013		title: MAKETU, WBOPDC		
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DETAIL A: KATIKATI, WBOPDC



DETAIL B: OMOKOROA, WBOPDC

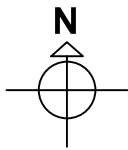
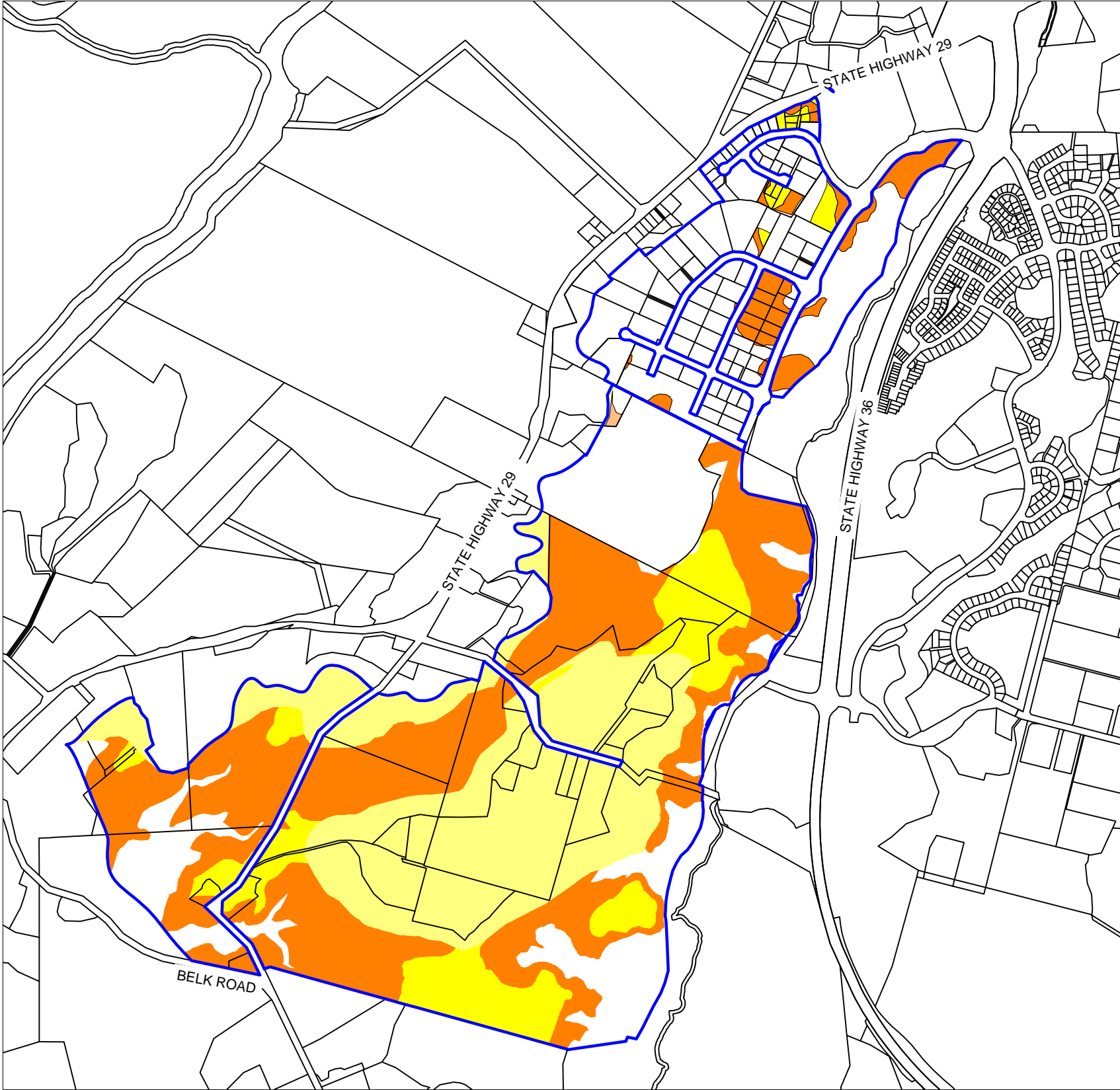


ZONE	AREA AVAILABLE
"EASY"	62.8 ha
"MEDIUM"	3.4 ha

- Notes:
1. Only vacant / partially vacant land shown.
 2. Only "EASY" and "MEDIUM" relative development complexity land shown.
 3. Includes Lots greater than 50m wide, unless where adjacent lots were vacant.
 4. For detailed definitions refer to full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 5. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 6. Refer to Figure B for Legend.

Base drawing reference - Property Boundaries provided by Bay of Plenty Regional Council 2012

revision	rev	description	drawn	approved	date	<div><div><div>0300600900</div><div>Horizontal Scale (metres)</div></div><div><div>0300600900</div><div>Vertical Scale (metres)</div></div></div>	drawn	KB	<div><div><div>coffey</div><div>geotechnics</div><div>SPECIALISTS MANAGING THE EARTH</div></div></div>	client: SMARTGROWTH			
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							date	01/05/2013		title: NORTHERN CORRIDOR VACANCY PLOT			
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							original size	A3					



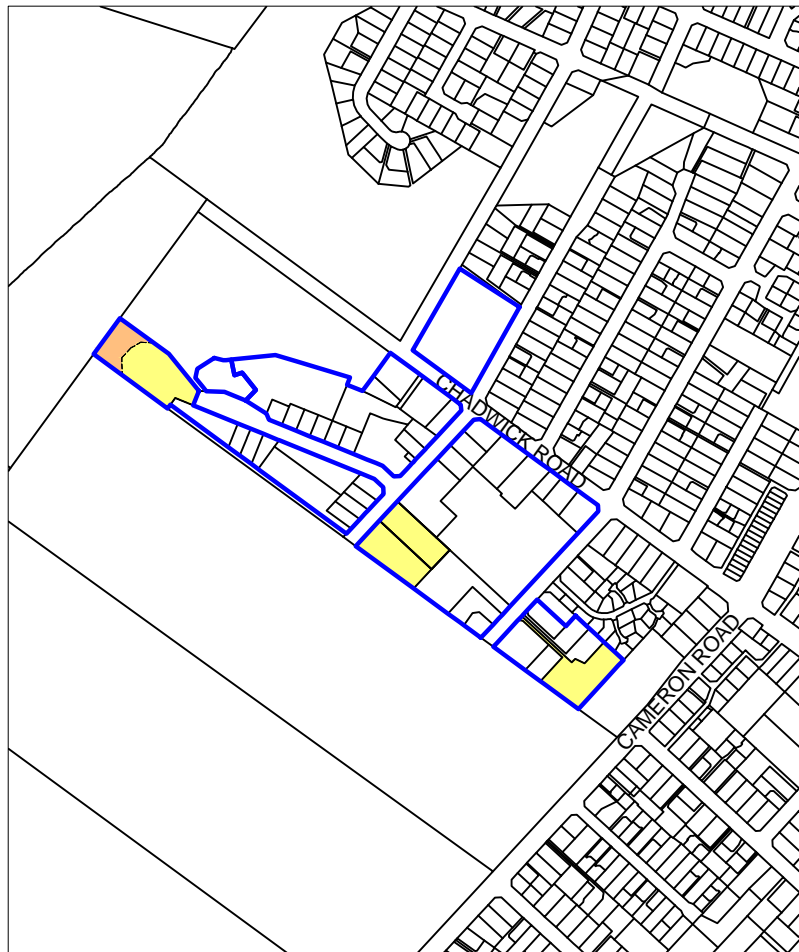
- Notes:
1. Only vacant / partially vacant land shown.
 2. Only "EASY" and "MEDIUM" relative development complexity land shown.
 3. Includes Lots greater than 50m wide, unless where adjacent lots were vacant.
 4. For detailed definitions refer to full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 5. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 6. Refer to Figure B for Legend.

ZONE	AREA AVAILABLE
"EASY"	94.5 ha
"MEDIUM"	84.9 ha

TAURIKO, TAURANGA

Base drawing reference - Property Boundaries provided by Bay of Plenty Regional Council 2012

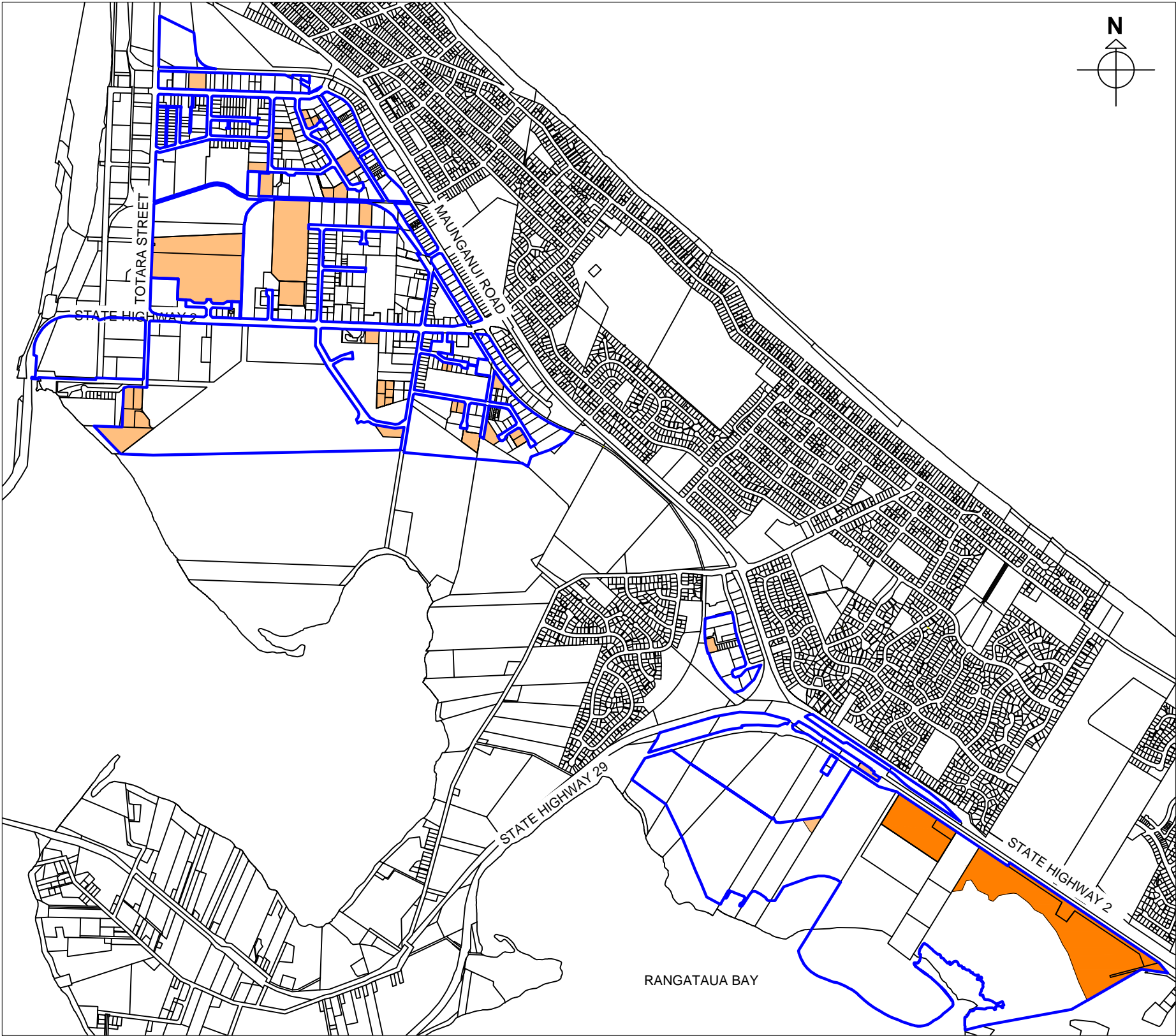
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							date	01/05/2013		title:	WESTERN CORRIDOR VACANCY PLOT		
							scale	1:15,000		project no:	GENZTAUC15724AA	figure no:	22
							original size	A3		rev:	0		



DETAIL A: GREETON, TAURANGA
SCALE: 1:10,000

ZONE	AREA AVAILABLE
"EASY"	1.71 ha
"MEDIUM"	69.20 ha

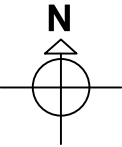
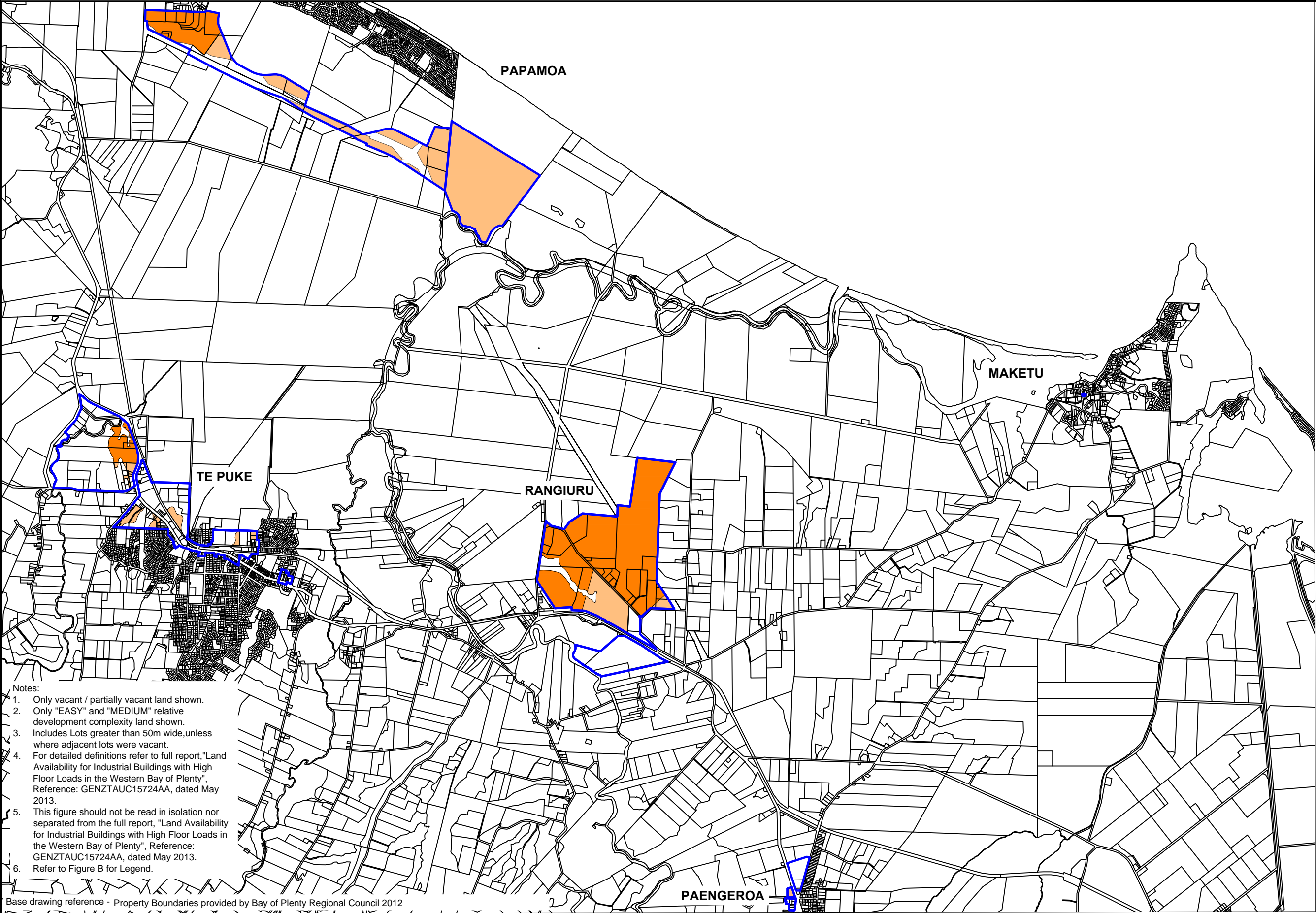
- Notes:
1. Only vacant / partially vacant land shown.
 2. Only "EASY" and "MEDIUM" relative development complexity land shown.
 3. Includes Lots greater than 50m wide, unless where adjacent lots were vacant.
 4. For detailed definitions refer to full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 5. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 6. Refer to Figure B for Legend.



DETAIL B: MOUNT MAUNGANUI AND TE MAUNGA, TAURANGA
SCALE 1:25,000

Base drawing reference - Property Boundaries provided by Bay of Plenty Regional Council 2012

revision	rev	description	drawn	approved	date	<div> <div>0 500 1000 1500</div> <div>Horizontal Scale (metres)</div> <div>0 500 1000 1500</div> <div>Vertical Scale (metres)</div> </div>	drawn	KB		client:	SMARTGROWTH		
							approved	SVH		project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title:	CENTRAL CORRIDOR VACANCY PLOT		
							scale	1:25,000		project no:	GENZTAUC15724AA	figure no:	23
							original size	A3		rev:	0		

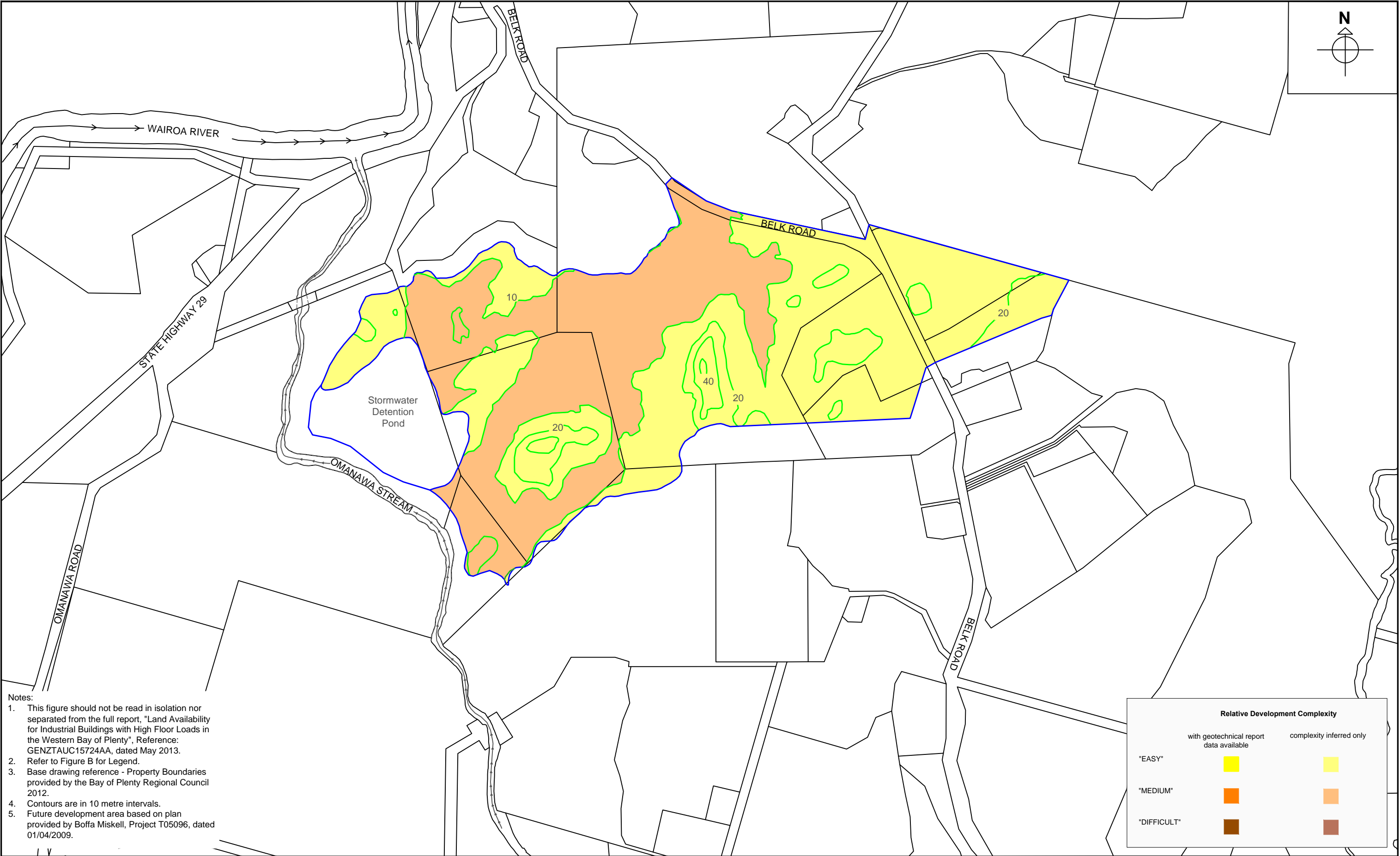


- Notes:
- 1. Only vacant / partially vacant land shown.
 - 2. Only "EASY" and "MEDIUM" relative development complexity land shown.
 - 3. Includes Lots greater than 50m wide, unless where adjacent lots were vacant.
 - 4. For detailed definitions refer to full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 5. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 - 6. Refer to Figure B for Legend.

Base drawing reference - Property Boundaries provided by Bay of Plenty Regional Council 2012

ZONE	AREA AVAILABLE
"EASY"	-
"MEDIUM"	469.5ha

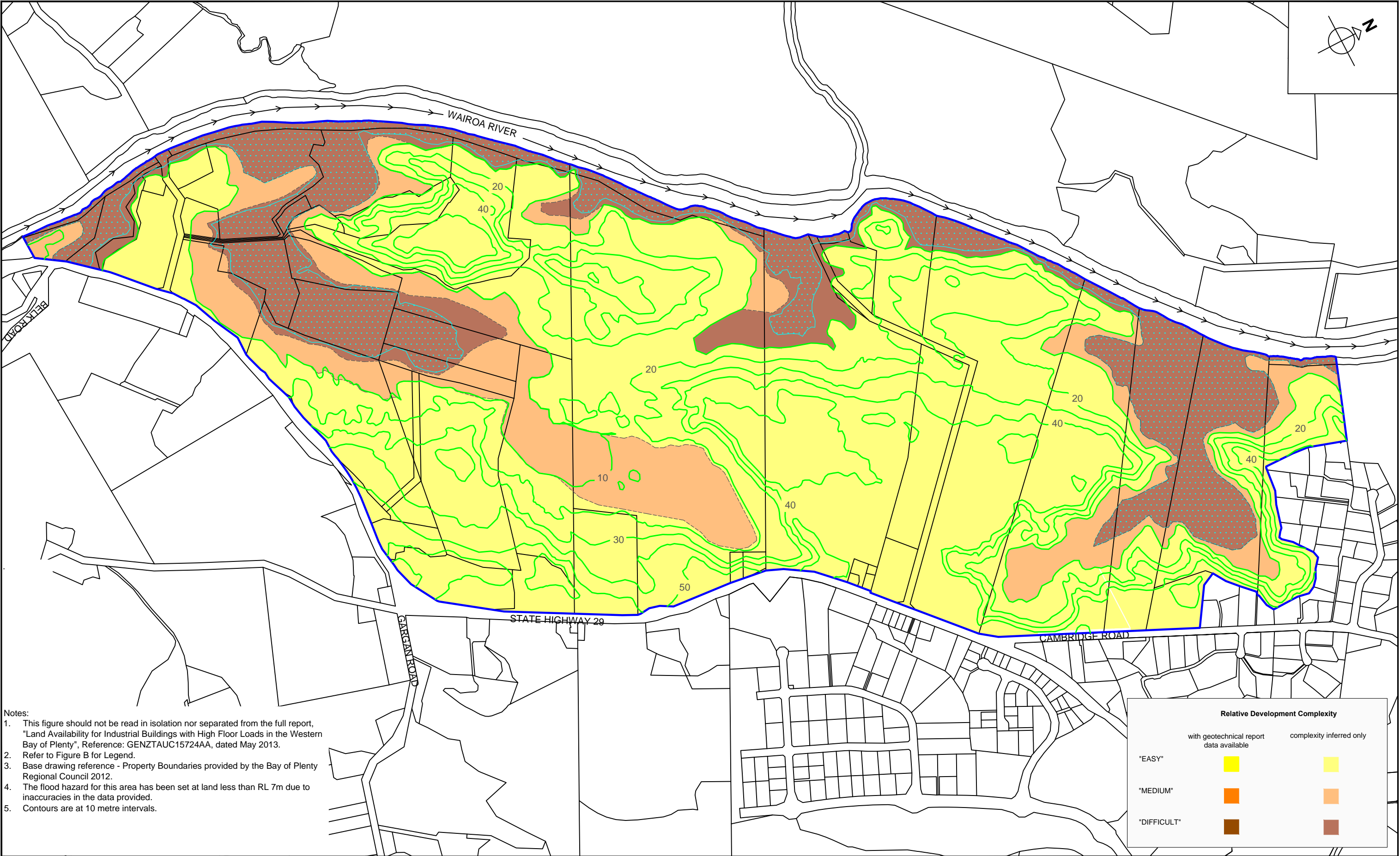
revision	rev	description	drawn	approved	date	<div><div><div>0500100020003000</div><div>Horizontal Scale (metres)</div></div><div><div>0500100020003000</div><div>Vertical Scale (metres)</div></div></div>	drawn	KB	<div><div>coffey</div><div>geotechnics</div><div>SPECIALISTS MANAGING THE EARTH</div></div>	client: SMARTGROWTH			
							approved	SVH		project: SMARTGROWTH HEAVY LOAD BUILDING PROJECT			
							date	01/05/2013		title: EASTERN CORRIDOR VACANCY PLOT			
							scale	1:50,000		project no: GENZTAUC15724AAfigure no: 24rev: 0			
							original size	A3					



- Notes:
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 2. Refer to Figure B for Legend.
 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.
 4. Contours are in 10 metre intervals.
 5. Future development area based on plan provided by Boffa Miskell, Project T05096, dated 01/04/2009.

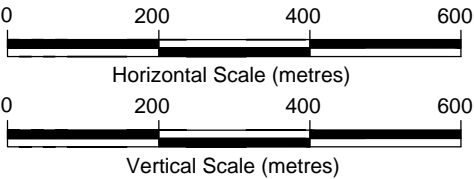
Relative Development Complexity		
	with geotechnical report data available	complexity inferred only
"EASY"	<div></div>	<div></div>
"MEDIUM"	<div></div>	<div></div>
"DIFFICULT"	<div></div>	<div></div>

revision	rev	description	drawn	approved	date	<div><div>0150300450</div><div>Horizontal Scale (metres)</div><div>0150300450</div><div>Vertical Scale (metres)</div></div>	drawn	KB	<div><div>coffey</div><div>geotechnics</div><div>SPECIALISTS MANAGING THE EARTH</div></div>	client:	SMARTGROWTH		
							approved	SVH		project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
							date	01/05/2013		title:	FUTURE DEVELOPMENT - BELK ROAD		
							scale	1:7,500		project no:	GENZTAUC15724AA	figure no:	25
							original size	A3		rev:	0		



- Notes:
1. This figure should not be read in isolation nor separated from the full report, "Land Availability for Industrial Buildings with High Floor Loads in the Western Bay of Plenty", Reference: GENZTAUC15724AA, dated May 2013.
 2. Refer to Figure B for Legend.
 3. Base drawing reference - Property Boundaries provided by the Bay of Plenty Regional Council 2012.
 4. The flood hazard for this area has been set at land less than RL 7m due to inaccuracies in the data provided.
 5. Contours are at 10 metre intervals.

revision	rev	description		drawn	approved	date



drawn	KB
approved	SVH
date	01/05/2013
scale	1:10,000
original size	A3



client:	SMARTGROWTH		
project:	SMARTGROWTH HEAVY LOAD BUILDING PROJECT		
title:	FUTURE DEVELOPMENT - WAIROA		
project no:	GENZTAUC15724AA	figure no:	26
rev:	0		

Appendix 1

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