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Our Reference 14-005

Group Agric Project & Maintenance Manager
Rainbow Farms (Pty) Ltd
PO Box 2734
Westway Office Park
3635

Date: 19 February 2014

Attention: Mr Korf Stoltz

Dear Mr Stoltz

KILLARNEY BROILER FARM, MKHAMBATHINI LOCAL MUNICIPALITY, KWAZULU-NATAL: WETLAND DELINEATION FINDINGS

1. INTRODUCTION AND SCOPE OF WORK

Makhalempongo Chicken (Pty) Ltd (hereafter referred to as Makhalempongo) is in the process of constructing a broiler farm on Portion 40 of Killarney 855 in the Mkhambathini Local Municipality within KwaZulu-Natal. Presently, the western portions of the site are characterised by marshy depressions and seepage areas hosting wetland vegetation. These marshy areas appear to be the result of past sand winning activities onsite that have altered the natural topography and stripped the topsoil and subsoils down to bedrock. In this regard, GCS (Pty) Ltd have been appointed to formally delineate the wetlands that occur within and in the vicinity of the proposed development as well as confirm whether they are of natural or artificial origin.

The appointed Scope of Work was to:

- Undertake a site visit to the property and identify and delineate any wetland systems that may be present within and/or in the vicinity of the proposed dam footprints.
- Confirm whether the delineated wetland systems are natural or artificial in origin.
- Provide a description of the National Water Act (1998) requirements.
- Identify and describe the potential impacts to be imparted on the delineated wetlands resulting from the proposed development.

- Where possible, provide mitigation measures and recommendations to minimise the potential impacts on the delineated wetland areas.

2. DESCRIPTION OF ACTIVITY

The proposed development will involve the construction of 7 broiler houses, an internal road network, an internal stormwater network including open concrete drains and two detention dams (referred to as control dams), a single septic tank system, a pre-treatment filtration system and collection dam, and a wastewater treatment plant, as shown in the layout plan attached as **Appendix A**. The control dams will capture and temporarily detain clean runoff generated by the farm, and the package treatment plant will treat the dirty waste water generated by the broiler houses.

3. METHODS

The outer temporary boundaries of the wetlands onsite were delineated using the method contained within the DWAF guideline 'A practical field procedure for the identification and delineation of wetlands and riparian areas' (DWAF, 2005; 2008). This guideline document stipulates that consideration be given to four specific wetland indicators required to determine the outer edge of the temporary boundary of a wetland.

These indicators are:

- Terrain Unit - identify those parts of the landscape where wetlands are most likely to occur e.g. valley bottoms and low lying areas.
- Soil Form - identify the soil forms associated with prolonged and frequent saturation.
- Soil Wetness - identify the soil morphological "signatures" (redoximorphic features) that develop in soils characterised by prolonged and frequent saturation.
- Vegetation - identify the presence of hydrophytic vegetation associated with frequently saturated soils.

For this study the soil wetness indicator was utilised to delineate the outer temporary wetland boundary. The vegetation and terrain indicators were used in a confirmatory role and soil formation identification was not undertaken and considered unnecessary.

Soil and vegetation sampling was carried out along transects across the valley bottom and low-lying areas within and in the vicinity of the tailings dam, east of the MR350 dirt road. At each sample point, soil was sampled at 0-10 cm and 40-50 cm and the dominant and

noteworthy vegetation within a 5m radius of the sample point was recorded. For each soil sample, the following soil characteristics were recorded:

- Soil colour (hue, value and chroma)
- Colour and abundance of mottles
- Soil texture

The soil hue, value and chroma were recorded for each soil sample in the field using a Munsell Soil Colour Chart.

The presence, colour and abundance of mottles observed were recorded in the field. Soil texture was determined in the field qualitatively 'by feel' and recorded.

A conventional handheld Global Positioning System (GPS) was used to record the location of the soil sampling points along each transect. The GPS points were then imported into ArcGIS 10 and the outer temporary wetland boundary along each transect determined. The boundary points were then combined to form a single continuous boundary using contour information, aerial photography and knowledge on the hydraulic conductivity of the soils. The GPS is expected to be accurate up to 3 metres.

4. FINDINGS

Soil and vegetation sampling within the south-western parts of the site, downslope of the current broiler farm construction area, identified the presence of temporary, seasonal and semi-permanent hydric soils and associated wetland vegetation communities as shown in **Figure 1**. Most of the soils sampled within the western potions of the property comprised dark brown-grey loamy silt and silty sand at the surface that grade into brown-grey to grey silty clay and silty sand. The majority of the hydric soils sampled had medium values (3-4), low chromas (1-2) and moderate to abundant orange and orange/red mottles. These soils are indicative of seasonally saturated soils. Within this seasonal wetness zone, there were isolated depressions characterised by more semi-permanent hydric soils and associated monotypic stands of obligate wetland plants like *Cyperus latifolius* and *Juncus lomatophyllis* (**Figure 1**). The presence of seasonal hydric soils was confirmed by the presence of sedge dominated secondary grassland communities. Moving upslope towards the broiler farms, the soils become less grey and mottles gradually disappeared from the soil profile.

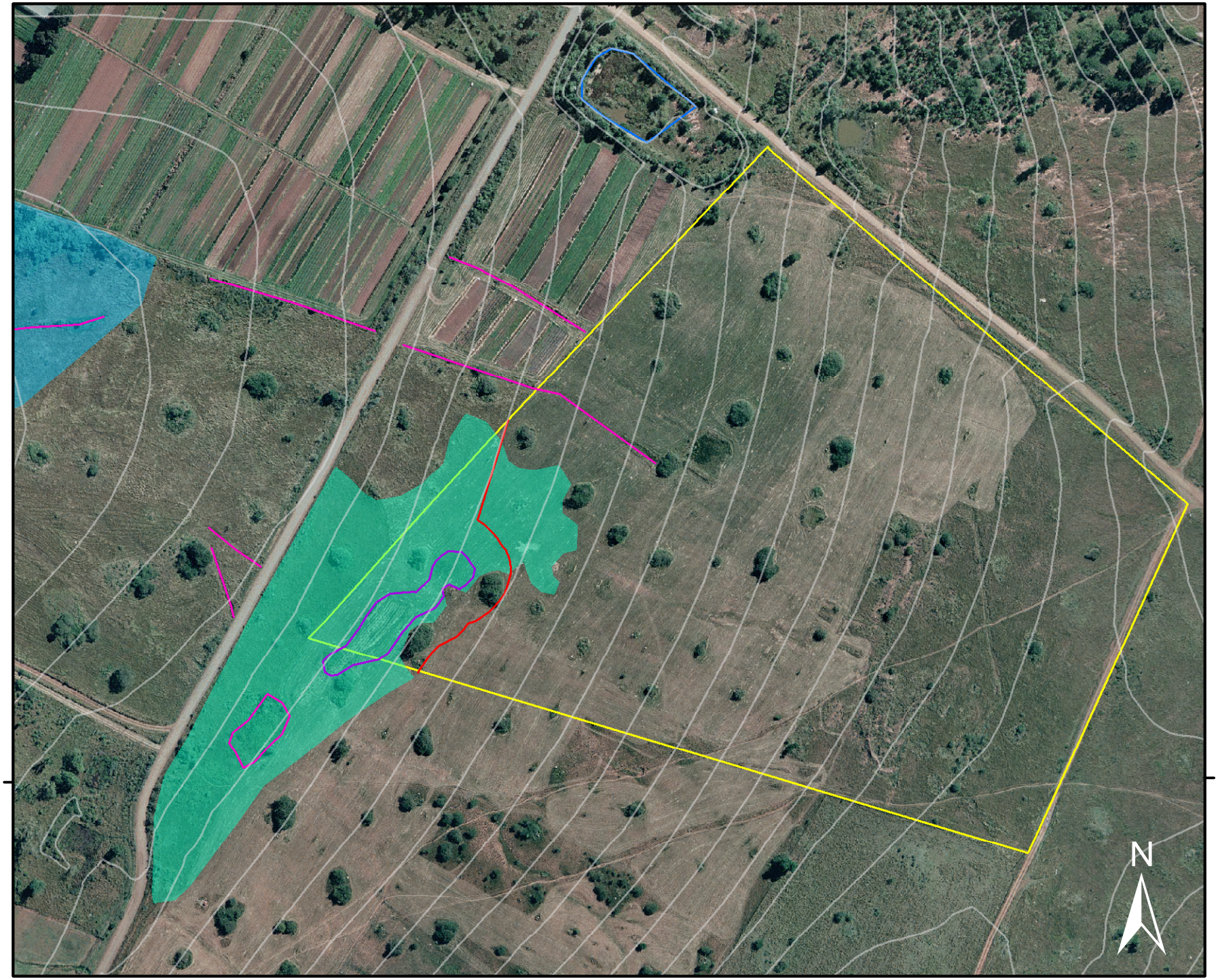
The area surveyed was located on a gentle west-facing slope that grades into a gentle valley head west of the site that naturally hosts a valley head seep wetland located

approximately 200m west of the proposed control dams. The uniformly sloping topography in combination with sandy soils is not necessarily associated with wetlands with the exception of perched wetlands created by clay layers that create isolated hillslope seepage wetlands. However, it was clear during the field work that the wetlands identified have formed within artificial depressions and low lying areas created by the excavation of topsoils and subsoils during past sand mining / winning activities onsite. From onsite observations and the presence of elevated mounds hosting bushclumps, it is clear that at least 0.5m - 1m of the soil profile across the site was stripped in the past. The elevated mounds are the only evidence of natural elevation of the land surface onsite. The removal of vast amounts the soil surface layers from the soil profile has created a broad, irregular depressional area that occurs as a band along the western boundary of the property. This depressional area currently intercepts subsurface seepage along the soil/bedrock and sand/clay interfaces, and the seasonal water table during the summer months. As a result anaerobic soil conditions are currently present, creating conditions for the establishment of rush, sedge and hygrophilous grassland communities.

Therefore, based on the onsite findings, the wetland areas in their current state and setting are artificial in nature. Due to a lack of information on the conditions of the site pre-sand mining, it is difficult to speculate whether hillslope seepage wetlands may have naturally occurred in the areas surveyed. In addition, the presence of hydric soils associated with the artificial wetland areas indicates that the shallow soil saturation has been prolonged and long enough for the development of redoximoprhic features in the soil profile.

The approximate outer edge of the hydric soils which is a proxy for the extent of the artificial wetland area is shown in **Figure 1**. As hydric soils can develop within weeks to months under highly saturated conditions, the hydric soil area represents the areas that have been the wettest over the longest period since the cessation of sand mining activities. The wet areas that show limited hydric soil characteristics have likely only been temporarily saturated over time and thus have not properly developed since the cessation of sand mining. The approximate location of the semi-permanent wetness zones are also shown as the *Cyperus latifolius* and *Juncus lomatophyllis* marsh patches in **Figure 1**.

FIGURE 1: WETLAND AREAS



Legend

- 2m Contours
- Artificial Drainage Channels
- No-Go Area Line
- Artificial Wetland (Hydric Soils)
- Potential Natural Wetland
- Existing Dams
- Farm Property

FIGURE NO.:	1
MAP NUMBER:	14-005_F1/01
DRAWN BY:	R. EDWARDS WETLAND SPECIALIST
REVIEWED BY:	R. STOW SENIOR SCIENTIST
DATUM: PROJECTION:	WGS84 GEOGRAPHIC
DATE:	FEB 2013
CLIENT:	MAKHALEMPONGO CHICKEN
PROJECT:	KILLARNEY BROILER FARM
SCALE:	1:2 883

0 15 30 60 Meters

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5. POTENTIAL IMPACTS AND MITIGATION MEASURES

In terms of potential direct impacts, structures and infrastructure planned to be located within and in close proximity to the artificial wetland areas are the stormwater control dams and waste water treatment plant. More specifically, one of the control dams is proposed within the northern edge of the artificial *J. lomatophyllis* marsh and a waste water treatment plant is located approximately 30m north of the *J. lomatohyllis* marsh. Therefore, if developed as planned, portions of the artificial wetlands areas and the secondary hygrophilous grassland communities will be cleared, in-filled, trampled and/or compacted during construction.

Potential indirect impacts to the artificial wetland areas include input flow capture, erosion and sedimentation and water quality reduction. With regards to flow capture, it is assumed that infiltration will occur at the dams which will reduce the impacts of flow capture. Therefore, the remaining wetland areas should experience minimal flow impacts. With regards to erosion and sedimentation, such impacts are likely to occur during the construction phase when clearing takes place in close proximity to the artificial wetland areas. In this regard, it is important that construction activities strictly adhere to the runoff and erosion control measures stipulated in the Environmental Management Programme. Such measures are assumed to include the use of sandbags and silt fences to capture sediment and slowdown runoff. With regards to water quality impacts, the small volumes of waste water and the treatment of the waste water to potable standards will effectively mitigate this impact as long as the treatment plant operates at 100%.

The significance of an environmental impact is a combination of the degree of change in the system being impacted and the importance of the system being impacted in terms of ecosystem services/resource and social importance. As the wetlands are artificial, the ecological importance of the wetland areas is expected to be low. However, these unnatural wetlands currently do provide some sediment trapping and water filtering services that give them some value. With the development and operation of the broiler farms and the associated water pollution risks, these services would become more important due to the increased likelihood of their realisation. As the control dams are planned as runoff control and filtration structures, they are in effect substitute for the functions of the artificial wetlands, thus reducing the impact on local ecosystem services.

Therefore, the significance of the proposed loss of artificial wetland area for the development of the control dams is expected to be low.

Nevertheless, the following mitigation measures are recommended where feasible/possible:

- Although not a significant impact, the semi-permanent wetland zones marked as the *J. lomatophyllis* and *C. latifolius* marshes in **Figure 1** should be excluded from development and maintained as part of the water filtration system of the site below the dam walls.
- Access to the construction area of the dams should not cross the *J. lomatophyllis* and *C. latifolius* marshes.
- The dam construction areas and access/haul roads must be clearly demarcated prior to construction commencing to the satisfaction of the appointed Environmental Control Officer (ECO). The no-go area for construction vehicles is shown in **Figure 1** and represents a 20m buffer to the *J. lomatophyllis* marsh.

6. LEGISLATIVE REQUIREMENTS

In terms of Section 1 of the National Water Act (Act No. 36 of 1998) (NWA), wetlands are legally defined as:

(1) "…land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

It is clear, based on the definition above, that the wet areas onsite can be defined as wetlands as they meet the first two conditions of the definition. However, as already stated, these wetland areas are artificial and the natural land present before the sand mining activities likely had limited or less extensive wetland characteristics. As the NWA does not distinguish/differentiate between natural and artificial wetlands, the determination of whether the alteration of artificial wetlands is a water use under Section 21 of the NWA is unclear. As the impact of the loss of portions of artificial wetland is expected to be of low significance due primarily to the artificial nature and integrity of the wetland areas, a Section 21 water use license would be an onerous requirement. However, the interpretation of the NWA is ultimately the responsibility of the Department of Water Affairs (DWA) and formal comment on their requirements after the submission of this letter report must be acquired.

7. ASSUMPTIONS AND LIMITATIONS

Soil and vegetation sampling was undertaken along transects aligned west to east. Therefore, the localised anomalies like elevated bushclumps and ridges are not excluded from the wetland area where these features were not encountered along the transects.

Only the wetland areas east of the MR350 road were delineated. The natural valley head / valley bottom wetland system located approximately 200m to the west of the Broiler Farm was not delineated and was not included in the appointed Scope of Work.

8. CONCLUSION

Soil and vegetation sampling within the property confirmed the presence of wetland areas as defined by the presence of hydric soils and wetland vegetation. However, onsite observations of the terrain indicate that the wetland areas are of artificial origin and have formed within depressional areas created by past sand mining activities onsite that currently intercept subsurface seepage. The closest natural wetland system is located approximately 200m west (downslope) of the proposed property within a valley head landform.

Although artificial, the wetland areas are expected to provide some runoff control and water filtration benefits, especially with the development of the broiler farm. However, the proposed control dams themselves will also provide runoff control and water filtration services, thus offsetting the loss of the patches of artificial wetland. Thus, the impact of the proposed dams on wetland and ecosystem services will likely be of low significance. Nevertheless, some general recommendations have been provided and ideally the semi-permanent marshy areas should be avoided where possible.

In terms of legislative requirements, the need for a water use license for the infilling and alteration of the wetland areas is unclear due to the artificial nature of the wetlands. Thus, confirmation of the legislative requirements will need to be acquired from the DWA.

Yours sincerely,

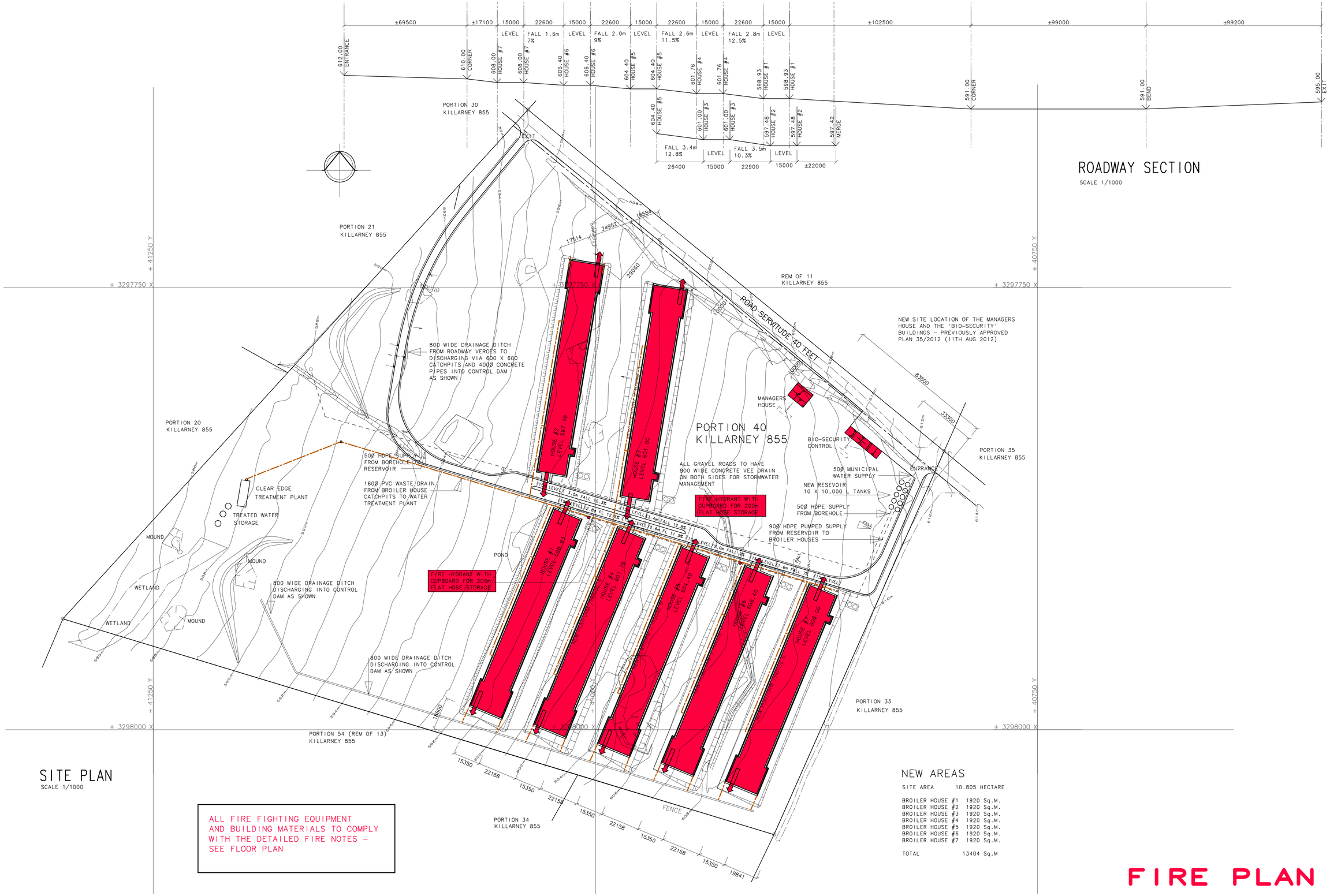
Ryan Edwards (Pr.Sci.Nat.)
Wetland Ecologist

Russell Stow (Pr.Sci.Nat.)
Principal Scientist

References:

Department of Water Affairs and Forestry (DWAF). 2005. A practical field procedure for identification and delineation of wetlands and riparian areas (edition 1). DWAF, Pretoria.

APPENDIX A – LAYOUT PLAN



ALL FIRE FIGHTING EQUIPMENT AND BUILDING MATERIALS TO COMPLY WITH THE DETAILED FIRE NOTES - SEE FLOOR PLAN

NEW AREAS

SITE AREA 10.805 HECTARE

BROILER HOUSE #1	1920 Sq.M.
BROILER HOUSE #2	1920 Sq.M.
BROILER HOUSE #3	1920 Sq.M.
BROILER HOUSE #4	1920 Sq.M.
BROILER HOUSE #5	1920 Sq.M.
BROILER HOUSE #6	1920 Sq.M.
BROILER HOUSE #7	1920 Sq.M.
TOTAL	13404 Sq.M

FIRE PLAN

NEW POULTRY HOUSES AND OFFICES FOR "MAKHALEPONGO CHICKENS" ON PORTION 40 OF THE FARM KILLARNEY #855

POULTRY HOUSES - SITE PLAN

PANGOLIN STRUCTURES
CONTROLLED ENVIRONMENT BUILDING SPECIALISTS
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DATE : FEBRUARY 2013
DRAWN : DJR - Pr.Arch.(S.A.)M.I.A.(4210)
SCALE : 1/1000 (A1)

MAKHALEPONGO 1043 / 05
SITE PLAN