ZAMBIA WORLD BANK

REPUBLIC OF ZAMBIA

MINISTRY OF AGRICULTURE AND LIVESTOCK

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
ANNEXES

REPORT VOLUME III
FOR THE PROPOSED

IRRIGATION SCHEME IN MUSAKASHI IN MUFULIRA DISTRICT

DECEMBER 2016

SOFRECO

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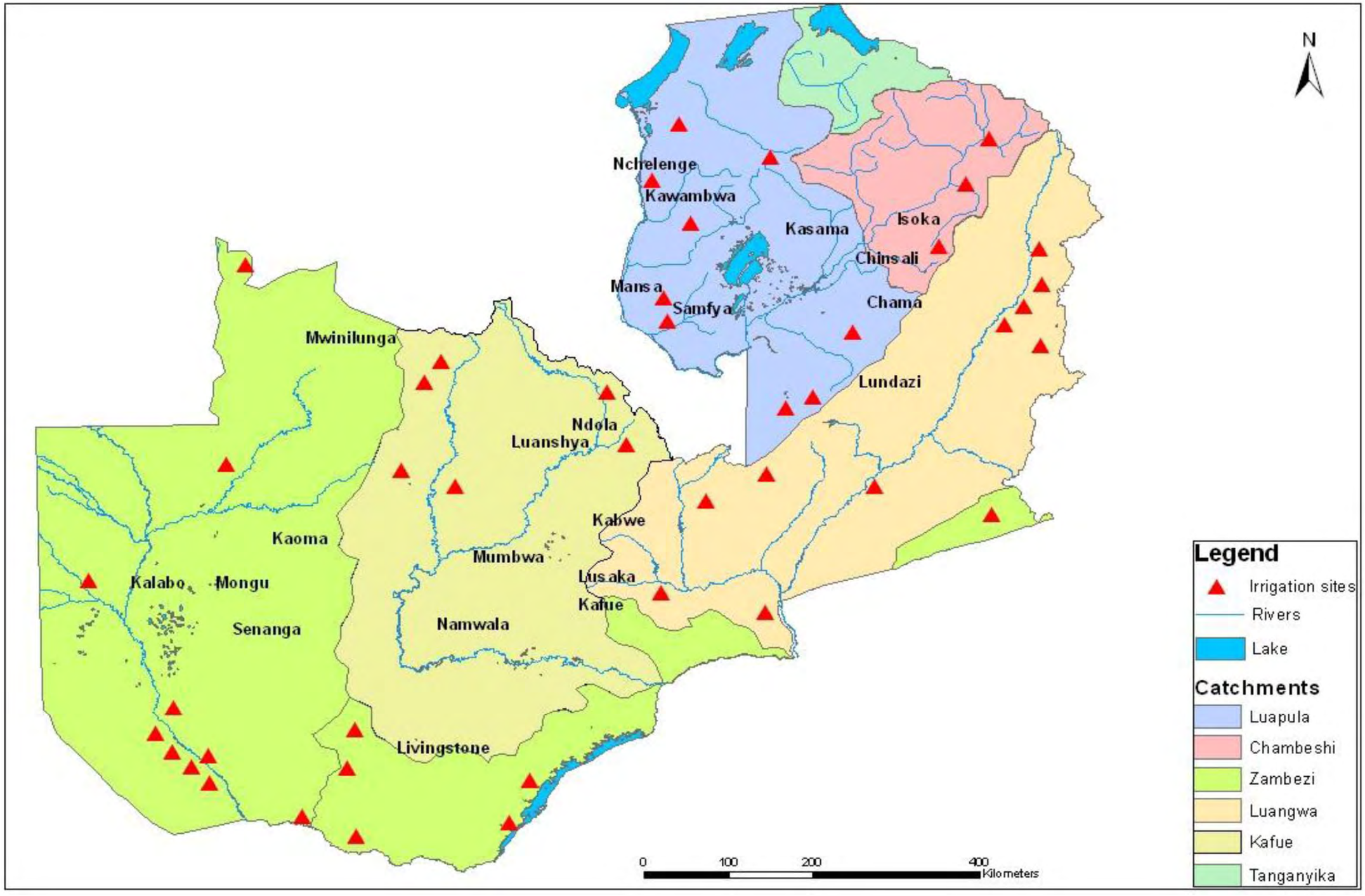


Figure 1-1 Irrigation schemes in Zambia (*Source National Irrigation policy*)

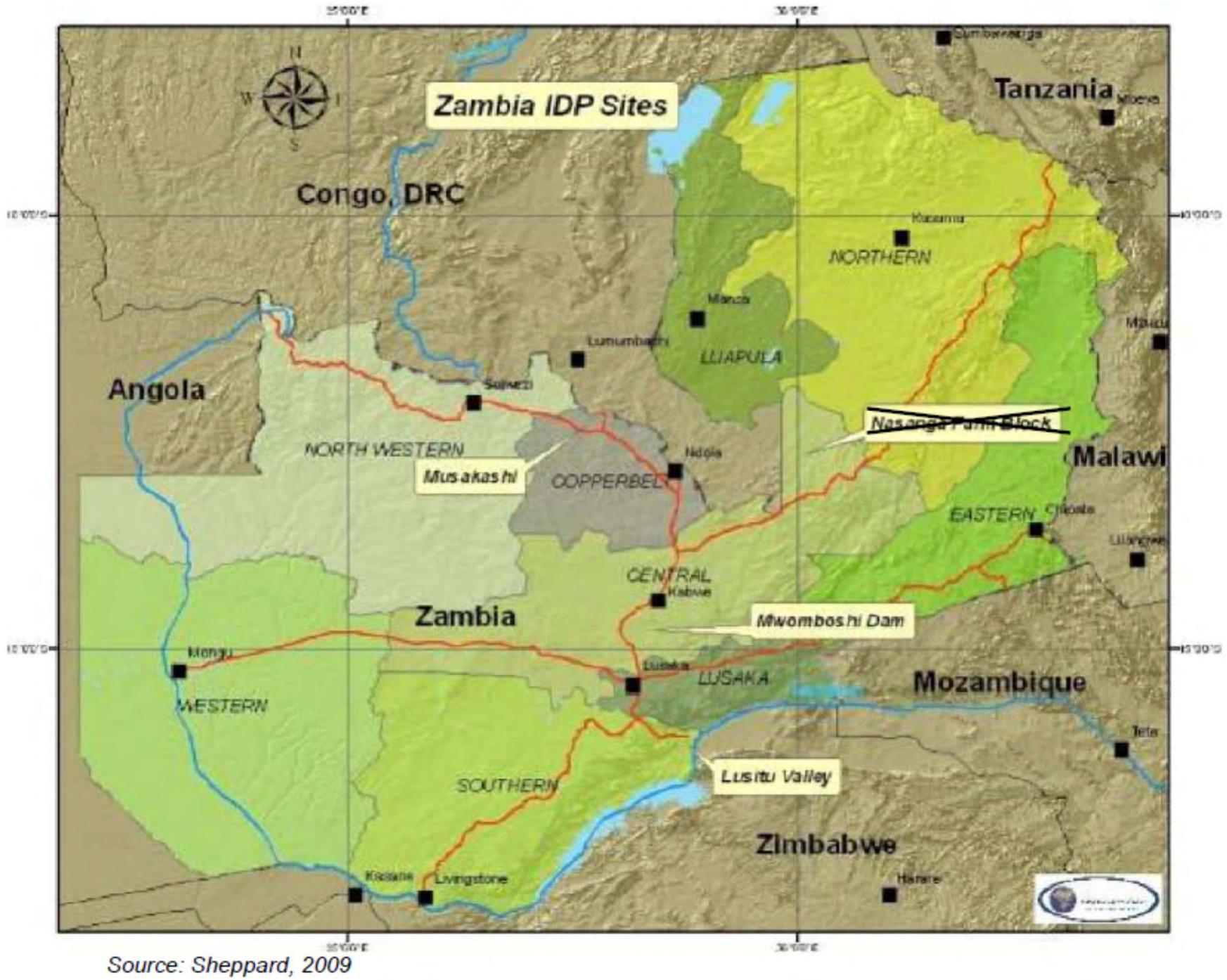


Figure 1-2 Location of IDSP Group 1 Sites

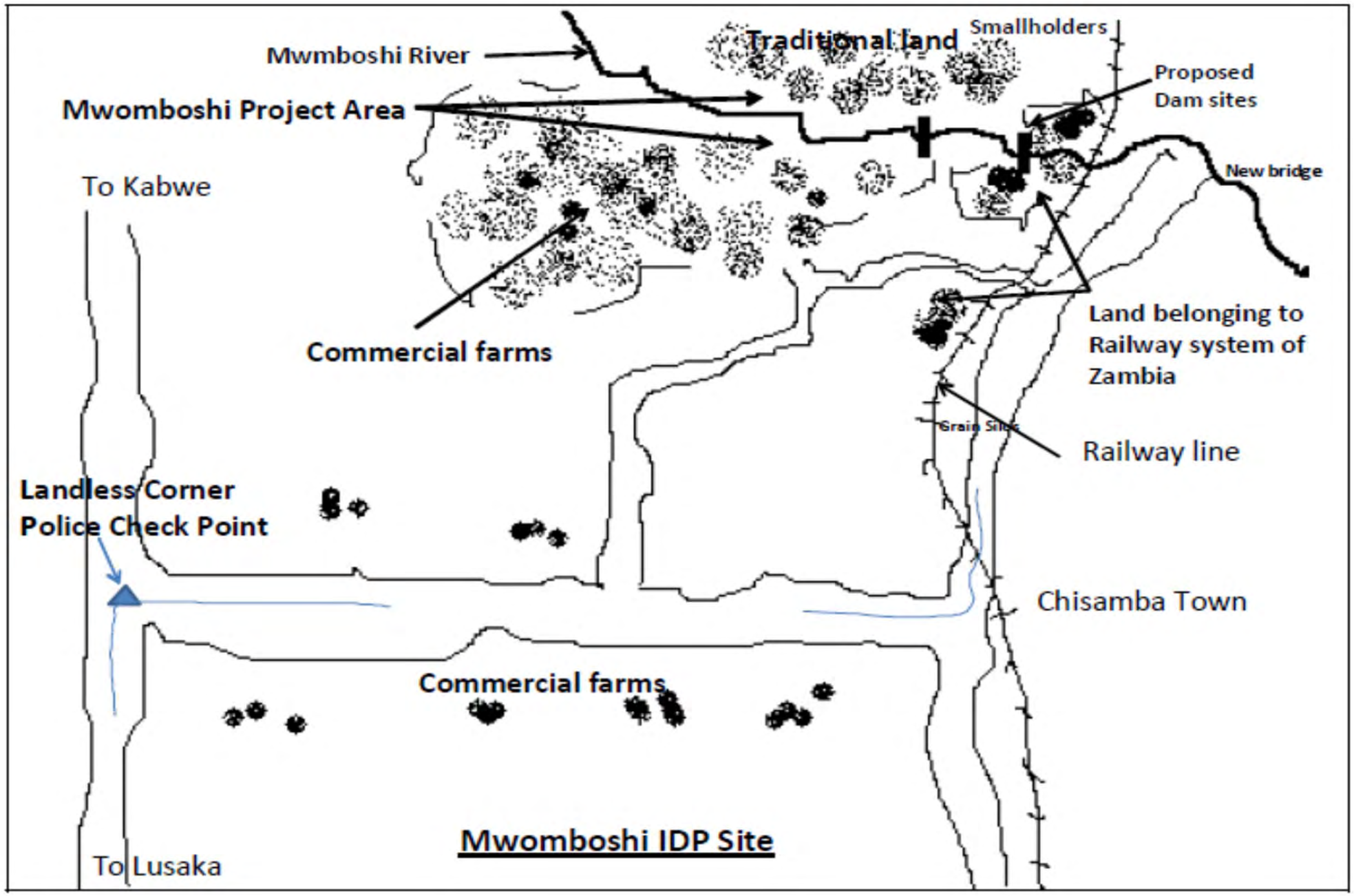


Figure 1-3 Sketch Map of the Location of Mwomboshi Group 1 Site.

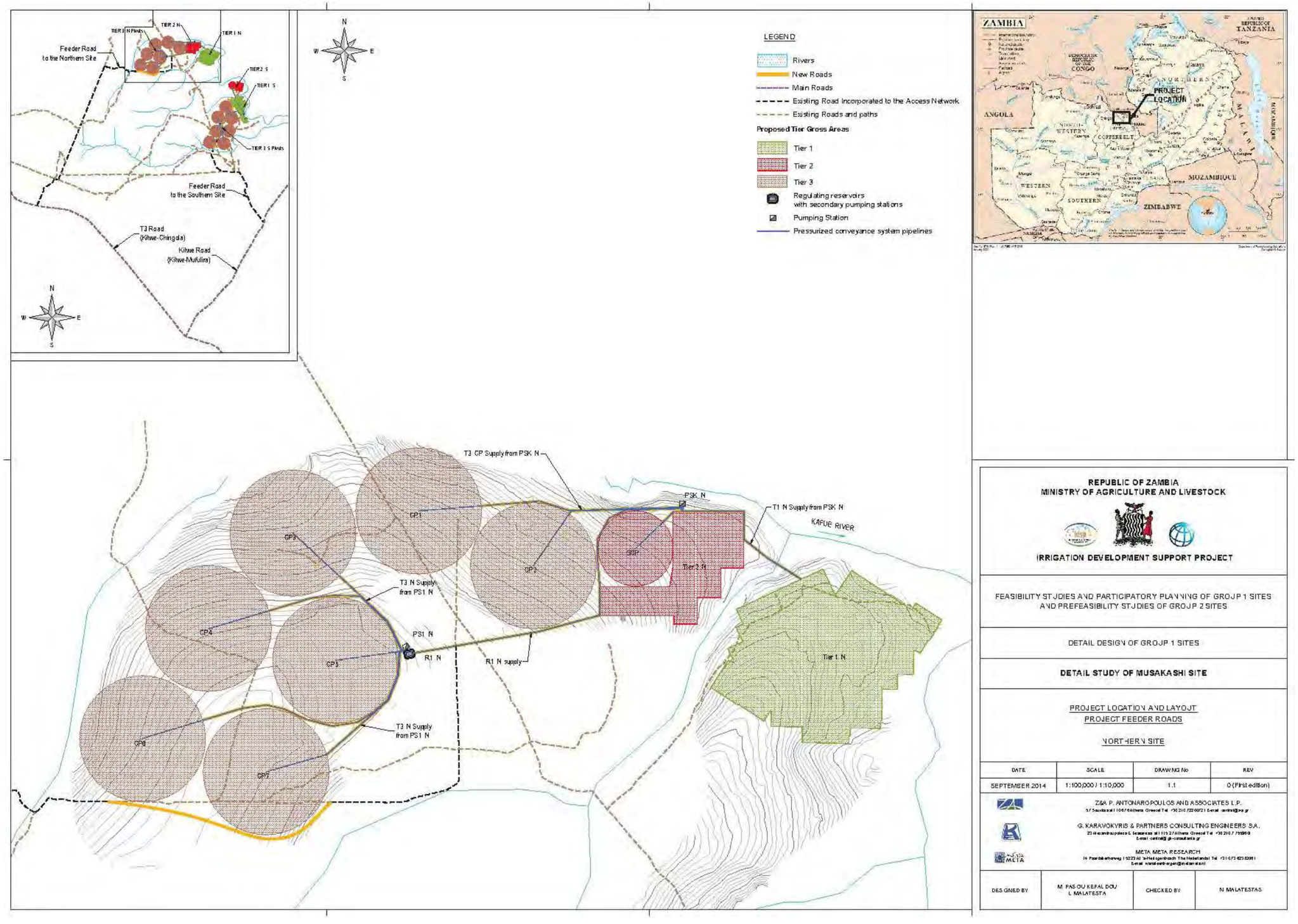


Figure 1-4 Layout of proposed irrigation system – North part (Z&A, 2014)

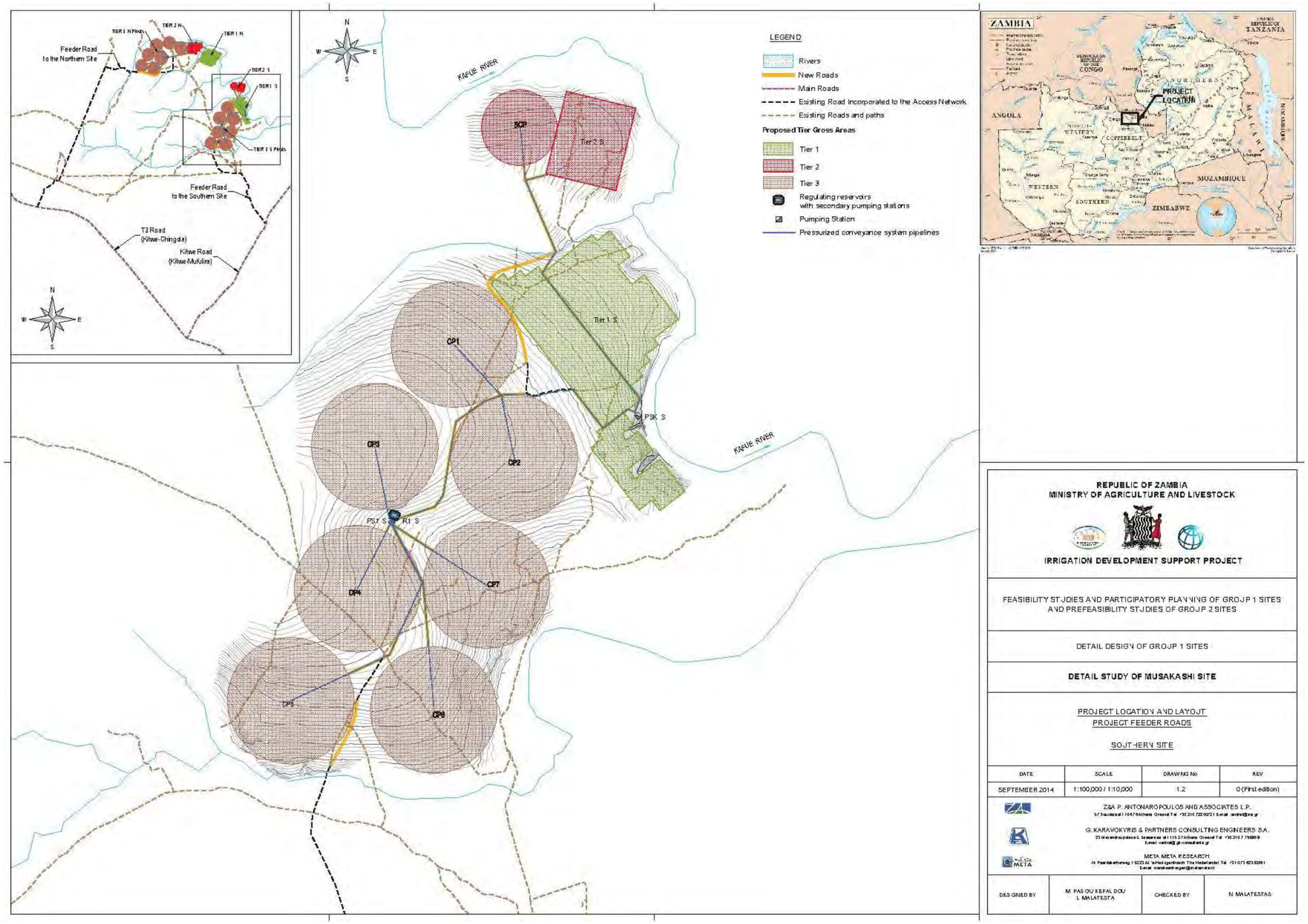


Figure 1-5 Layout of proposed irrigation system – South part (Z&A, 2014)

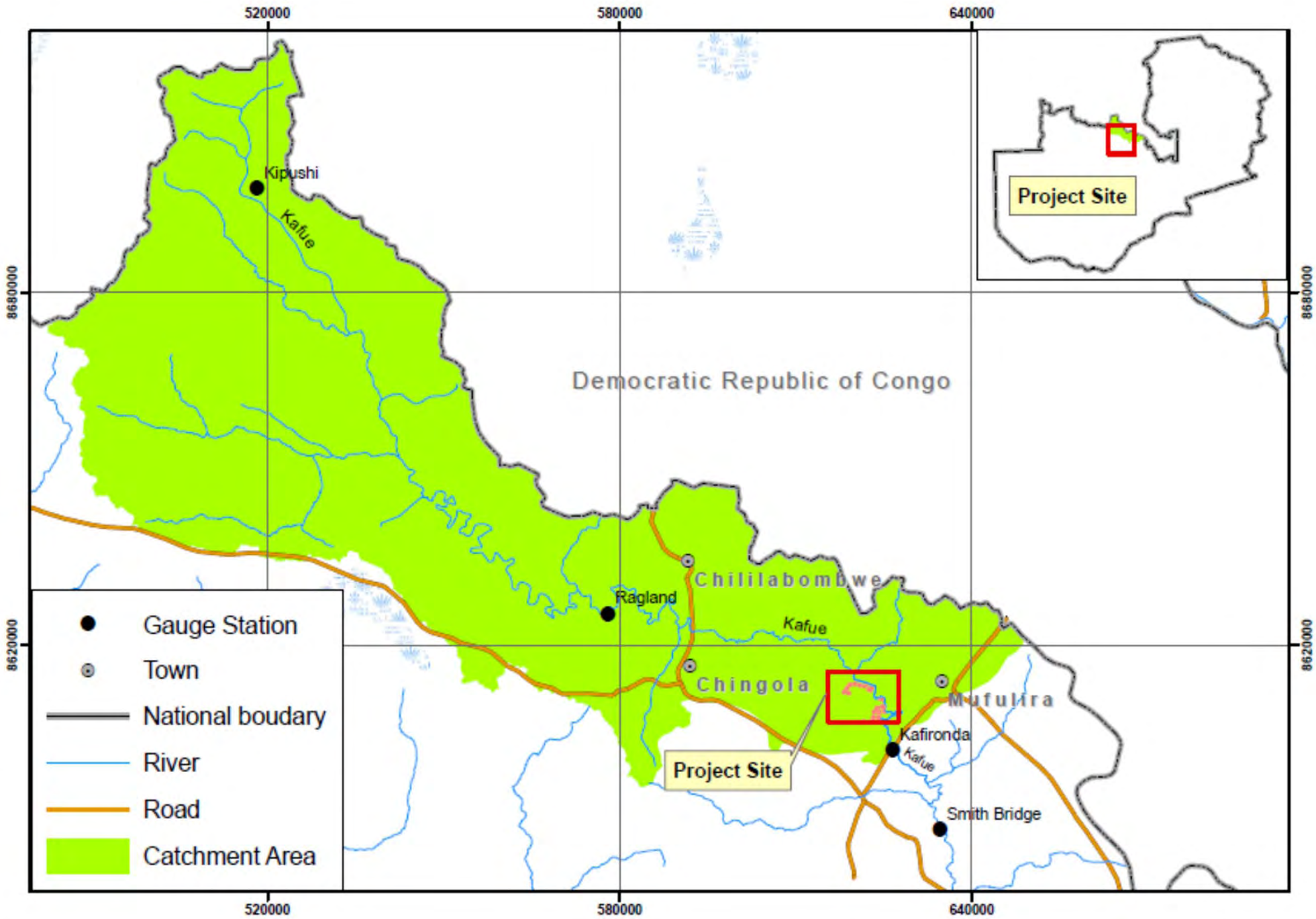


Figure 1-6 Catchment extent of Kafue River at Kafironda Hydro Station

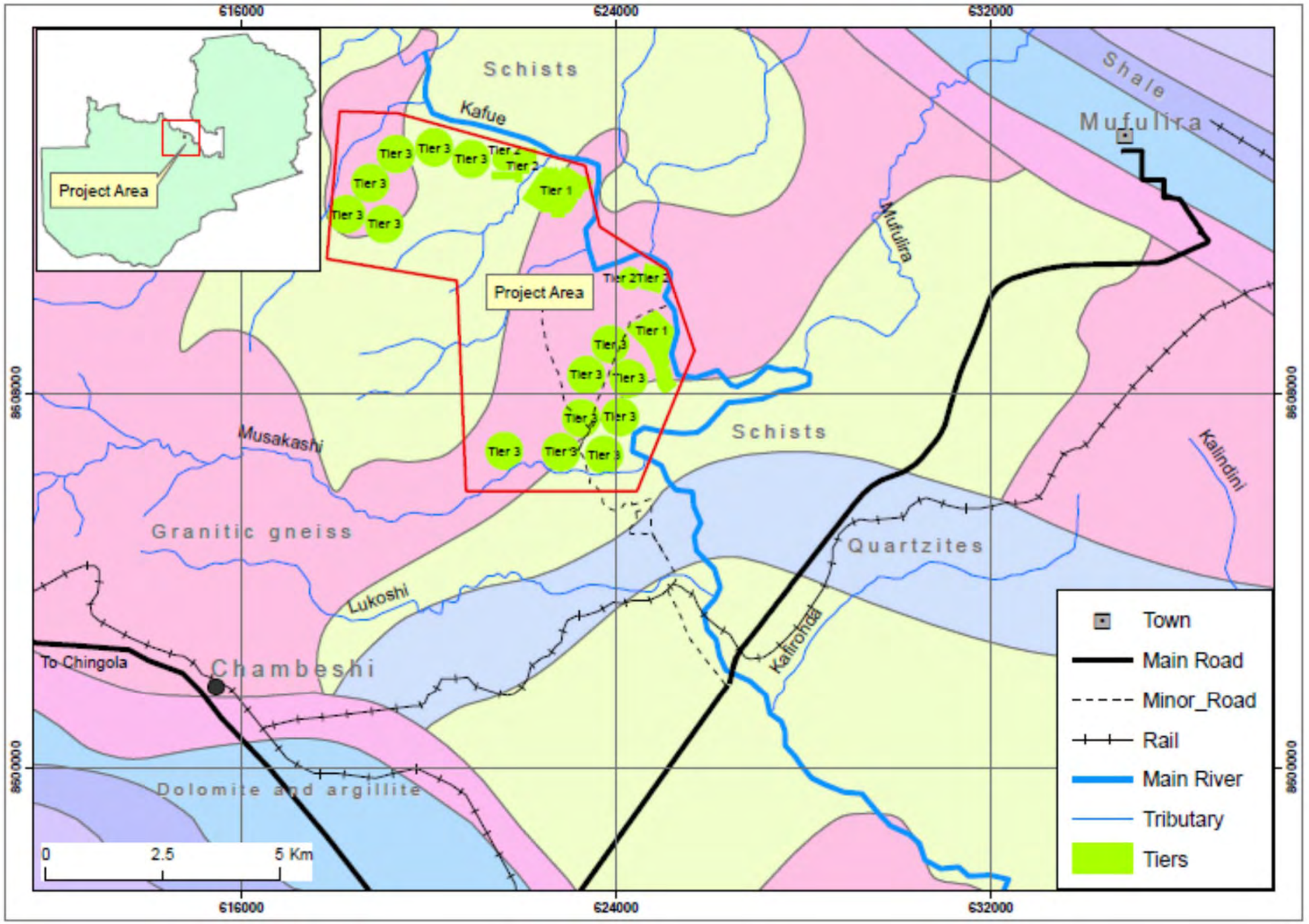


Figure 1-7 Geological map of Musakashi Site and surrounding areas

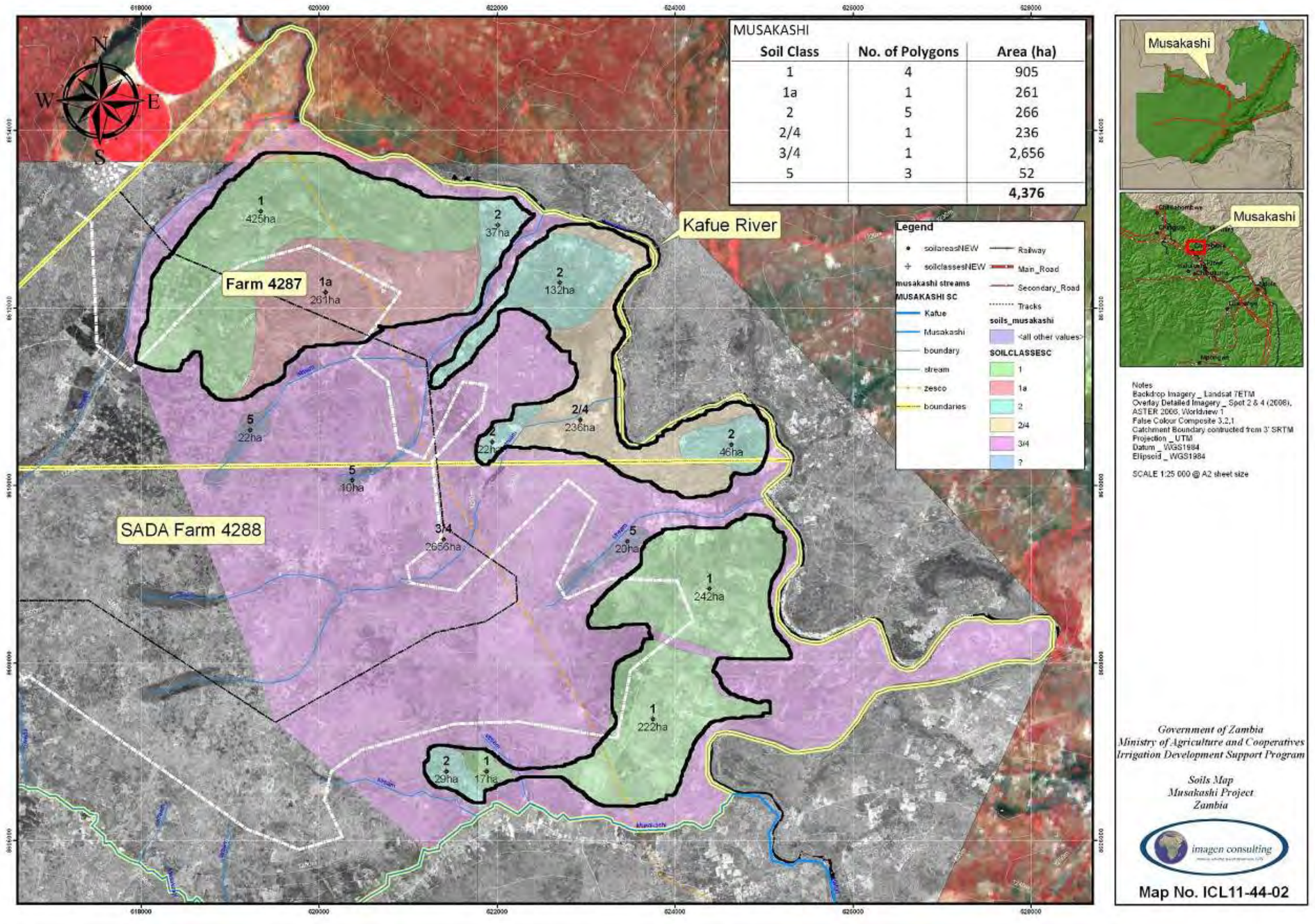


Figure 1-8 Soil types inside the project site area; mauve colour for soils type 3 and 4

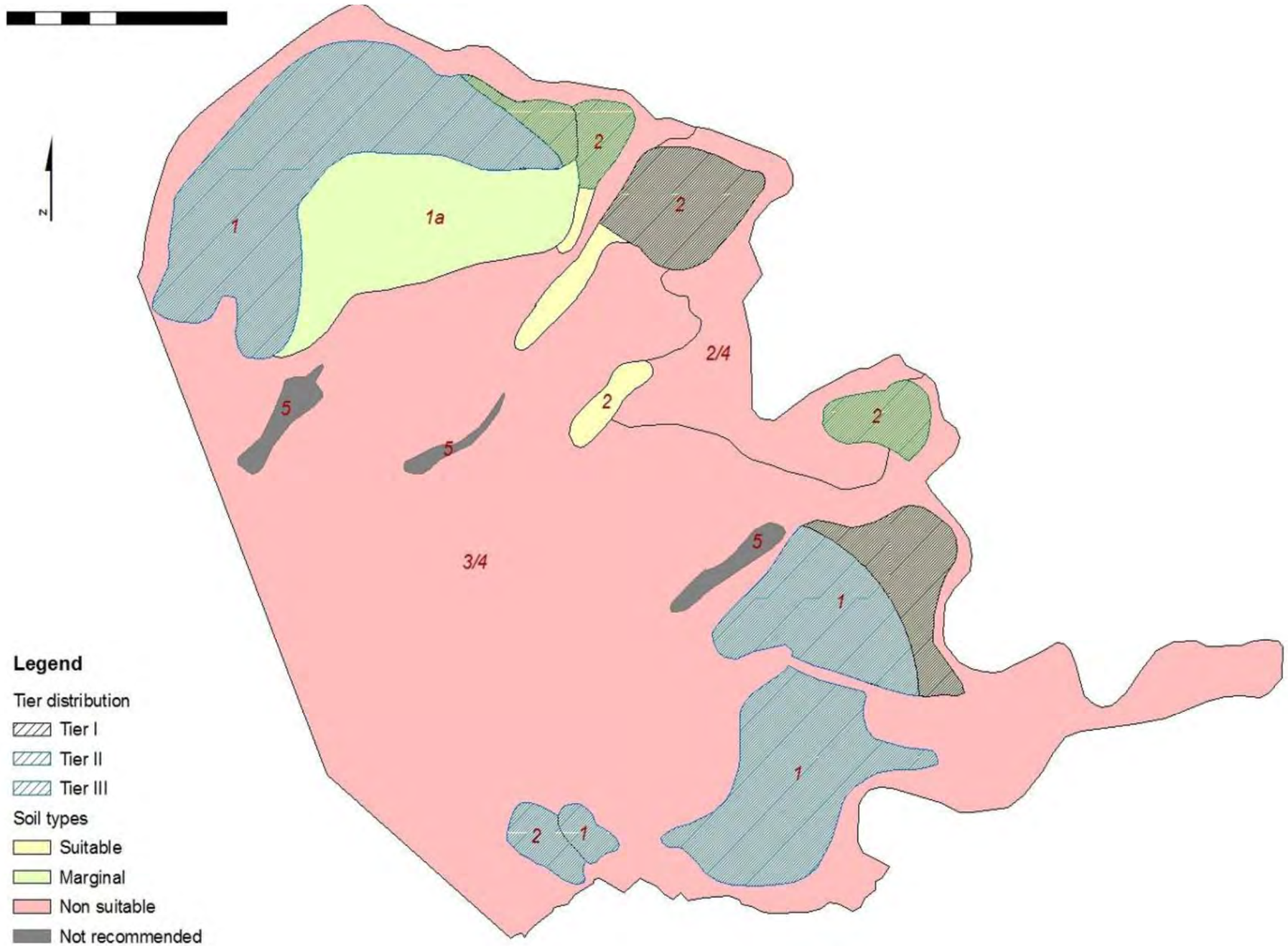


Figure 1-9 Soil suitability map of Musakashi and proposed irrigation areas

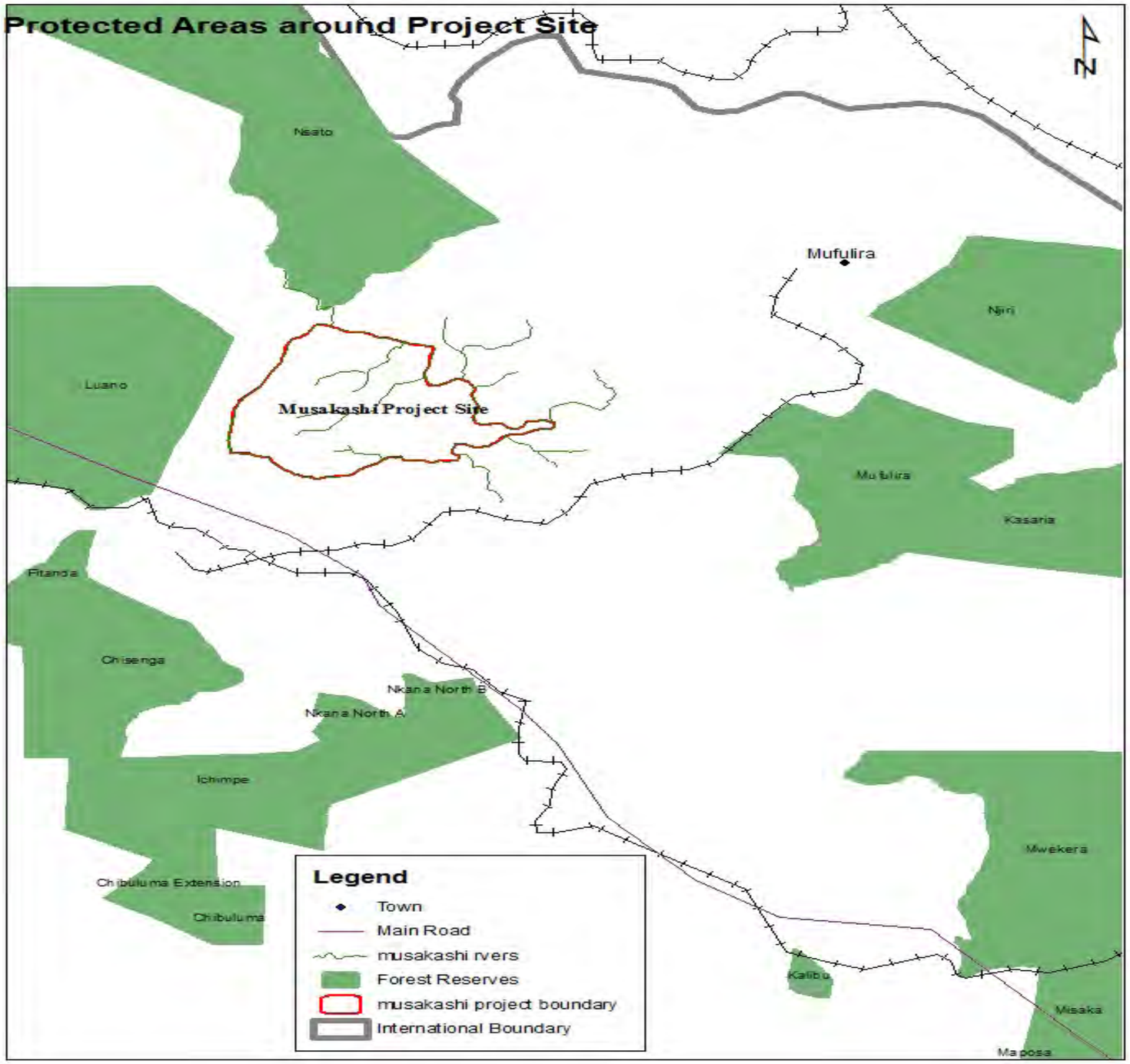


Figure 1-10 Protected Areas around the Project

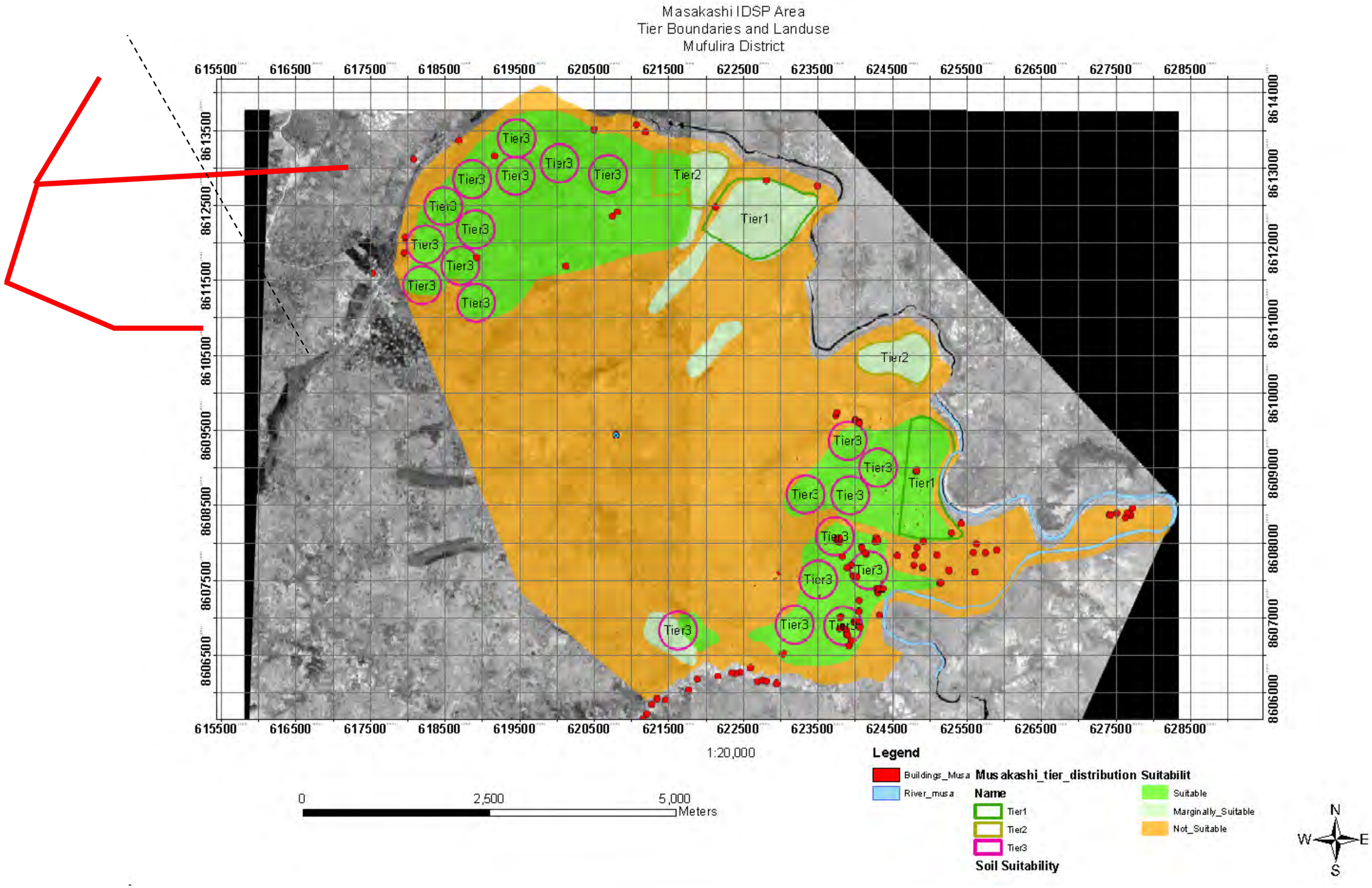


Figure 1-11 Musakashi: Land Use and Settlement

2 ANNEX 2: INTEGRATED PEST MANAGEMENT PLAN (IPMP)

Principles of IPM

Integrated Pest Management (IPM) is an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimize the use of pesticides (FAO, 2013). IPM is based on:

- Acceptable pest levels - the emphasis is on control, not eradication. All pests have an economic threshold below which the cost of control exceeds the benefit;
- Preventive cultural practices – with good planning and husbandry, many pest threats can be mitigated;
- Monitoring- inspection and identification. With specialized support and experience, most farmers will be able to undertake this, but recording will remain the responsibility of the IPM manager;
- Safe and responsible controls -in order of priority: mechanical, biological and then chemical. (USEPA, 2012).

The benefits of IPM include:

- Reduced pesticide usage, leading to safer working conditions, less pollution, safer food, reduced resistance in pest populations, the enhancement of natural pest-enemy populations, and usually lower production costs;
- Improved recognition and understanding of pest problems amongst farmers, leading to timely interventions and higher yields;
- Increased bio-diversity;
- More sustainable production systems.

In the context of this IPM plan, pests include agricultural insect pests and plant diseases, weeds, birds, rodents, and human or livestock disease vectors

Requirements for World Bank Funded Projects

The World Bank Operational Policy (OP 4.09 - Pest Management, December 1998) states that:

The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the

proposed use and the intended users. With respect to the classification of pesticides and their specific formulations, the Bank refers to the World Health Organization's *Recommended Classification of Pesticides by Hazard and Guidelines to Classification* (Geneva: WHO 1994-95). The following criteria apply to the selection and use of pesticides in Bank-financed projects:

- They must have negligible adverse human health effects;
- They must be shown to be effective against the target species;
- They must have minimal effect on non-target species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them;
- Their use must take into account the need to prevent the development of resistance in pests.

The Bank requires that any pesticides it finances be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to standards acceptable to the Bank. The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

Implications for the IDSP

The intensive agriculture expected to be developed under the IDSP will inevitably lead to an increase in pesticide use. Most of the proposed area (except part of Tier 2 which is still un-cleared) is currently used for rain-fed crop production, mainly sorghum and maize. These crops are normally grown without pesticides, except for seed dressings on purchased seed. Vegetables, in particular, have a much higher requirement for insecticides and fungicides.

Class II products are permitted as Zambia has adequate legal provisions for managing agrochemicals. The Government controls distributors of pesticides through the Environmental Management Act (EMA), particularly, the Pesticides and Toxic Substance Regulations No.28 of 1997. All Distributors are required to be licensed by ZEMA, with conditions. In addition, the distributors are expected to provide the right information to the farmers through right labelling and training (D. Phiri p.c. Sep-13)

In addition, any company who will be distributing the pesticides in the project area will be expected to provide the required training. It is not expected that any Class I chemicals will be required in the project area as there are adequate Class II or III products to control any pests. Distributors operating in the area must be directed not to supply Class I chemicals.

IPM strategy for Musakashi

Main pest challenges

Almost 90% of the irrigated area will be occupied by wheat in the winter, and soya beans in the summer. Although there are risks of serious crop losses in mono-cropping systems, the wheat/soya rotation is particularly successful in Zambia because the continual rotation of graminaceous and leguminous crops breaks the

life cycle of many pests, especially weeds, and the crops have relatively few major enemies which cannot be easily controlled. The main threats are from foliar diseases which are normally controlled with resistant varieties or fungicides.

Wheat – Fungal: stem rust (*Pucinia graminis*), leaf rust (*Puccinia recondita*) and powdery mildew (*Erysiphe graminis*).

Soya beans –Fungal: rust (*Phakopsora pachyrhizi*), frog-eye leafspot (*Cercospora sojina*), red leaf blotch (*Pyrenochaeta glycines).*

Bacterial: bacterial blight (Psuedomonas syringae / glycines), bacterial pustule (Xanthamonas phaseoli)

Vegetables suffer from a wide range of pests, but one major threat to almost all vegetables are nematodes, which are difficult to control, can build up in the soils over seasons and cause serious losses. As they thrive in light soils, they can be expected to pose a particular threat to intensive vegetable production at Musakashi. As herbicide usage in vegetables is limited by the danger to following crops and limited range available, much of the weed control will be manual, which is a major challenge in such a large area of vegetables. The major diseases in tomatoes are early and late blight, powdery mildew and several viruses introduced by insects. Cabbage and other brassicas are usually attacked by caterpillars, especially the larvae of diamond-back moth. Watermelons and other cucurbits are particularly vulnerable to virus diseases.

Maize - the main pests are cutworm, stalk-borer, maize streak virus, grey leaf spot and termites.

The intensive vegetable plots in Tier 1 will be particularly susceptible to pest outbreaks, with multiple users in close proximity growing common crops.

Training

Training of farmers is the first and most important step. It must be assumed that none of the Tier 1 and Tier 2 farmers have received training in IPM. The Tier 3 and 4 senior management is expected to be conversant with IPM, but their middle management will require IPM training which will be conducted before the scheme is operational. In addition pesticide distributors will be required to provide training in safe handling and application to all buyers, and provide labels on all packs.

Pest identification is a key component of training, together with practical methods of monitoring pest populations. Then control methods will be covered, with cultural controls taking priority, followed by biological interventions, and then chemicals as a last resort.

Cultural practices

The techniques that will be employed include:

- Good husbandry as healthy crops are more resistant to pest attack and damage;
- Crop rotation and timing of planting/harvest – specifically for Tier 1 and part of Tier 2 where annual crops will be grown;
- Inter-cropping – planting different crops within each plot at the same time to repel or disrupt insect pests and nematodes;
- Choice of variety or cultivar – this often requires purchasing improved varieties of seed or plant material, which can be relatively expensive. The training will

emphasise the benefits of using genetic resistance and tolerance to diseases. There are no GMO cultivars available in Zambia, but there is a wide selection of improved non-GMO varieties with good disease-resistance packages;

- Irrigation practices and drainage – good water management to promote crop growth while avoiding excessive watering and standing water;
- Field hygiene – removal of diseased and infested plants, both in a growing crop and after harvest, will reduce the chance of spread to other plants or subsequent crops;
- Weeding - Weeds disrupt the growth of crops and can act as hosts for pests. Regular hand-weeding is required in small) vegetable plots in Tiers 1 and 2;
- Mulching – the use of benign organic matter to protect the soil from direct sunlight and damage by rain or overhead-irrigation improves the environment for crop growth and beneficial organisms. Farmers must first remove seeds from mulch and avoid using diseased plant material. Minimum tillage.

Most of these techniques are standard farming practices, but they require planning by the farmer, which will start with training and improve with experience and extension services provided under the project. They are not fool proof solutions, and need to be augmented with direct interventions (see below) in order to keep pest levels below economic thresholds. Some will require extra labour, such as weeding, mulching and field hygiene.

Biological controls

There is a limited selection of biological controls that can be purchased in Zambia. Predatory insects are not commercially available, but there is an increasing range of bacterial and fungal agents that can be purchased. The major agrochemical suppliers are now actively promoting new biological formulations. The main source of beneficial organisms will be from the naturally-occurring population, which will be encouraged by inter-cropping of plants that attract them, and minimal use of broad-spectrum pesticides.

The controls that can be employed include:

Bacterial agents e.g. *Bacillus thurengensis (BT)* suspension for the control of caterpillars and bollworms, *Bacillus sp.* + *Psuedomonas sp.* (Nemablok) for nematodes, *Bacillus sp.* + *Psuedomonas sp.* (Patostop) for fungal disease on roots and foliage on all crops, *Gliocladium sp.* For root and stem diseases like Fusarium – these are readily available from local suppliers

Natural insecticides e.g. Neem – not readily available

Predatory nematodes to control plant-parasitic nematodes – need to be encouraged by minimum tillage and mulching.

Green manures with nematicidal and soil-improving properties e.g. mustard, *Tagetes sp.,* red sun-hemp – seed can be multiplied locally, best planted in rainy season when less demand for cropping land.

The biological controls which are recommended are bacterial agents, which are affordable and can be sprayed, or applied through center-pivots, and green manures which have multiple benefits and are cheap to grow.

Mechanical controls

These methods involve actions by the farmer such as hand-picking, erecting insect barriers, using traps, and tillage to disrupt breeding. Hand weeding is also a mechanical control for weeds. The use of simple homemade traps is a practical solution for vegetables.

The traps can be coloured bowls with water, or coloured boards coated with oil. Yellow traps attract leaf-miner adults, whiteflies, aphids (winged forms) and thrips among other insect pests. Thrips are also attracted to white and blue. As the yellow colour attracts many insect species, including beneficial insects, use yellow sticky traps only where necessary (Infonet, 2013). Sticky yellow boards have been successfully used in Zambia to control crop pests like leaf miner.

Light traps can be used to attract moths of armyworm, stalk-borer, and cutworm, however they also attract many other insects and are not practical for small holders. Specific pheromone traps are the most effective for mass-trapping but are not readily available and not affordable for small holders.

Mechanical controls are not recommended as a major tool in insect pest control, but hand-weeding will be the main method of weed control in vegetables.

Chemical controls

The use of chemicals should be restricted to WHO Class III (slightly hazardous) products whenever possible, with Class II (moderately hazardous) chemicals used only when essential. Class II includes many commonly used pesticides including synthetic pyrethroids, dimethoate, and endosulphan (WHO, 2004). It will be necessary to educate farmers on the dangers of these chemicals both to themselves and consumers, and the natural pest- predators and wildlife. The list of class 3 alternatives must also be provided. There is a sufficient range of chemicals which are Class II or better available in Zambia to control all of anticipated pest problems. Table 21 (in section 4.4: Agrochemicals) above, lists the recommended chemicals which will control most of the anticipated pests to an acceptable level.

Handling and application of chemicals

Although most vegetable farmers are familiar with spraying, all farmers and workers in Tiers 1 and 2 will need training in safe handling and application techniques. Knapsack sprayers will be the main method of application in small plots, but protective clothing, which is rarely used, must also be available from chemical suppliers, together with the required training. Larger plantings in Tier 3, Tier 2 out-growers and Tier 4 will be sprayed by tractor and boom-sprayer, while large center pivots with standing crops will receive some fungicide applications by aerial spraying.

Storage of chemicals

The use of chemicals comes with an obligation to store them securely. The development of the scheme must include chemical storage facilities. Tier 3 will build their own store and it is recommended that the groups or cooperatives occupying Tier 2 do the same. Tier 1 is more problematical due to the number of farmers involved, and their habit of keeping their chemicals at home. It is recommended that chemical distributors be required to supply affordable and lockable plastic boxes for farmers to store their chemicals in, as a centralized store for Tier 1 is impractical. Tier 4 farmers already have chemical stores.

Monitoring and management

A crucial component of a successful IPM programme is the effective and regular monitoring of pest populations. This requires expertise in the form of extension officers, record keeping and some practical traps for insect pests. The traps employed must be of a type that can be easily supplied and maintained, which necessarily restricts the range of insects that can be monitored in this way. Regular field inspections by trained officers will be the most effective method of monitoring, and the officer can provide advice to farmers. Records must indicate quantitative observations and advice given to farmers. This approach will also teach farmers in field situations and make the IPMP more sustainable.

There is an incentive for Tier 3 to cover the IPM management of Tier 2 out-growers, who may occupy the small center pivots, however there is no obvious linkage between Tier 3 and the vegetable growers on Tier 1 and 2, so this responsibility would be best taken on by extension officers of MAL, who are already active in the area and whose capacity is expected to be improved as the scheme develops. The implementation of IPM is especially important, and challenging, in Tier 1, with many individuals growing susceptible crops in a confined area. There must be a collective approach to pest control, rather than individuals reacting only to their own problems – this will require strong leadership from extension officers and lead farmers.

The management of the IPMP requires annual reviews to be made to assess its effectiveness, the levels of adoption and compliance, and to amend the plan if necessary. It must also take note of observations made by the environmental monitoring team and determine if pesticides are damaging the environment. The annual review should be conducted by MAL, who can out-source the task to an IPM expert if they do not have the capacity.

Table 23 below outlines the activities required to implement and monitor the IPM programme. Priority must be given to Tier 1 when implementing the plan.

Table 2-1 IPMP implementation schedule

PHASE	ACTION	OBJECTIVE	RESPONSIBILITY	TIMING
Pre- operation	Update IPMP and share with trainers	To ensure training covers all the required components which can be practically applied.	CB&CP	At least 1 month before training starts
	IPM training of lead farmers T1 and extension officers	Teach farmers principles & methods of IPM	CB&CP with external provider	At least 3 months before opening of T1
	IPM training of T2 framers and T3 & 4 middle management	Teach farmers/managers principles & methods of IPM	CB&CP with external provider	At least 3 months before opening of T2-4
	Scouting of existing rain-fed crops & report	Establish baseline of pest pressure and train farmers how to scout & record	MAL Extension Officers	Rainy season following IPM training
	Scouting of existing vegetable crops & report	Establish baseline of pest pressure and train farmers how to scout & record	MAL Extension Officers	Dry season following IPM training
	Selection of approved chemical suppliers	Approve only those suppliers that are reputable, registered, and capable	IDSP-NC	Before scheme is operational
Operation – Yr1	Training in safe chemical handling/storage	Ensure that all users are aware of hazards and safe handling & application	IDSP-NC	Within 3 months of operation starting
	Commence regular scouting of vegetable crops & recording	Monitor pest levels and implement controls	MAL Extension Officers	Monthly
	Refresher training of lead farmers T1 and extension officers	Reinforce 1st training and address problems which have arisen.	External provider engaged by MAL	1 year after 1st training
	Scouting of T3 & T2 out-grower crops, & records	Monitor pest levels and implement controls	T3 management	Monthly from 1st planting
	Scouting of T4 crops & recording	Monitor pest levels and implement controls	T4 management	Monthly from 1st planting
Monitoring Yr1	Review of IPMP and report to MAL	Assess results and effectiveness of 1st yr of IPMP, report on pests and controls.	External consultant engaged by MAL	After 1 yr of operation
	Corrective actions based on review	Revise IPMP in light of experience in 1st year, explain any new approaches to MAL E.O.s	External consultant with MAL Extension Officers	Following review of IPMP
Operation – Yr2+	Implementation of revised pest control methods	Improve the effectiveness and adoption of the IPMP	MAL Extension Officers with lead farmers and T3 mgmt.	Following approved corrective actions
	Scouting of all crops & recording	Monitor pest levels and implement controls	Lead farmers	Monthly
	Scouting of T4, T3 & T2 out-grower crops, & records	Monitor pest levels and implement controls	T3, T4 management	Monthly
Monitoring Yr2+	Review of IPMP and report to MAL	Assess results and effectiveness of IPMP, report on pest problems and controls used, recommend improvements.	IPM expert from MAL or external	Repeat annually

3 ANNEX 3: WATER QUALITY RESULTS

Nr.	Parameter	T4, Zambezi river @ Lusitu	T1, Zambezi river @ Chirundu	T6, Zambezi river @ Jordan	M2, Musakashi borehole	T3, Kafue river @ Musakashi	T2, Kafue river @ Kafironda	T5, Kalimina School(T05) (Mwomboshi)	WHO Guideline (Maximum permissible value for drinking water)
1	Bicarbonate (mg CaCO3/l)	80	68	74	40	270	425	140	500
2	Sulphate (mg/l)	2	<0.01	2	1	74	107	1	250
3	Chloride (mg/l)	9	8	5	6	13	10	15	250
4	Total phosphate (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5
5	Magnesium (mg/l)	12	8	10	8	29	40	3	-
6	Calcium (mg/l)	12	15	14	5	60	106	53	200
7	Potassium (mg/l)	1.9	1.7	1.1	1.3	2.8	2.1	3.2	-
8	Sodium (mg/l)	5.9	5.3	3.3	4	8.6	6.6	9.9	200
9	Manganese (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
10	Cadmium (mg/l)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003
11	Lead (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
12	Zinc (mg/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.211	3
13	Copper (mg/l)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	2
14	Aluminium (mg/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2
15	Total Hardness (calculated)	**81**	**70**	**75**	**44**	**268**	**427**	**144**	500
18	pH	7.1	7	7	5.8	7.8	7.8	6.82	6.5 - 8.5
19	Ec (µS/cm)	93	93	93	50	491	785	372	1500
20	Eh (mV)	-17	-15	-21	54	-85	-61	-58	-
21	TDS(mg/L)	46	47	47	25	245	391	162	1000
22	Temp (°C)	25.4	26.4	26.8	23.9	26.7	26.4	24.9	-
23	Ionic balance, % error	10	11	9	13	-4	-3	11	
24	Sodium Adsorption Ratio	**0.3**	**0.3**	**0.2**	**0.3**	**0.2**	**0.1**	**0.4**	-
25	Residual Sodium Carbonate	**-0.3**	**-0.3**	**-0.3**	**-0.2**	**-0.9**	**-1.6**	**-0.6**	-
26	Magnesium Hazard (MH), %	63.13	45.41	54.96	72.48	44.14	38.31	8.24	-
19	Chloride Toxicity (CT), meq/l	0.25	0.23	0.14	0.17	0.37	0.28	0.42	-

4 ANNEX 4: MAIN PLOT DATA COLLECTION FORM

TREE PARAMETERS DATA FORM						*FORM A*
Altitude.....	Plot No.....	Date.....		Quadrant No.....		Plot Size.....
Centre of Plot (GPS Reading UTM) N..... E.....		Vegetation Type.....				
Recorder.....						
SPECIES (TREE ≥ 5CM)	HEIGHT (M)	DBH (CM)	CROWN SIZE a Width	CROWN SIZE b Length	STEM HT (M)	NOTES**

** Indicate any noticeable damage, crookedness, fungal attack browsing signs, form, fire occurrence etc.

Plant Species Identification Codes:

√ ? – Genus identified, species uncertain; (Write GENUS name and ?)

+ / --- Identification not sure; (Write SUSPECTED NAME and + / -)

?? – Plant not identified (Write: SPP, Id No. and Plot No.)

5 ANNEX 5: REGENERATION PLOT DATA COLLECTION FORM

TREE REGENERATION DATA FORM				*FORM B*
Altitude……	**Plot No……..**	**Date……..**	**Quadrant No……**	**Plot Size……**
Centre of Plot (GPS Reading UTM) N…….. E……		**Vegetation Type……**		
Recorder……				
SPECIES	**COUNT**	**NOTES****		

** Indicate any noticeable
damage, crookedness, fungal attack
browsing signs, form, fire occurrence etc.

Plant Species Identification Codes:

√ ? -- Genus identified, species uncerta + / - -- Identification not sure; ?? – Plant not identified
(Write GENUS name and ?) (Write SUSPECTED NAME an (Write: SPP, Id No. and Plot No.)

6 ANNEX 6: FAUNA DATA COLLECTION FORM

Mammals

	Species		No. Seen		Signs - write details	Other faunal species
1						
2						**Reptiles**
3						
4						
5						
6						
7						
8						
9						
10						
12						
13						
14						**Amphibians**
15						

Birds

	Species		No. Seen		Signs - write details	
1						
2						
3						
4						
5						
6						
7						**Invertebrates**
8						
9						
10						
12						
13						
14						
15						

Fire occurrence

☐ Recent

☐ Old

Notes

7 ANNEX 7: LIST OF BIRDS OBSERVED IN THE FARM AREA

Table 7-1 Birds Observed during Surveys

No.	Bird Species	Scientific Name	Latitude	Longitude
1	African Dater	*Anhinga rufa*	28° 20´ 28".90	14° 47´35".22
2	African fish Eagle	*Haliaeetus vocifer*	28 21 31.59	14 45 59
3	African Pied Wagtail	*Motacilla arguimp*	28 19 51.85	14 46 04.04
4	Bateleur	*Terathopius ecaudatus*	28 20 42.43	14 46 01.90
5	Blue Waxbill	*Uraeginthus angolensis*	28 20 28.90	14 47 35.22
6	Common Bulbul	*pycnonotus barbatus*	28 20 39.60	14 46 28.97
7	Crowned Hornbill	*Tockus alboterminatus*	28 18 26.36	14 46 15.43
8	Emerald-spotted wood Dove	*Turtur chalcospilos*	28 20 28.90	14 47 35.22
9	Fork-tailed Drongo	*Dicrurus adsimilis*	28 18 08.55	14 46 57.47
10	Greater Honeyguide	*Indicator indicator*	28 15 19.71	14 46 21.85
11	Grey Lourie	*corthaixoides concolor*	28 14 12 .75	14 46 28 .97
12	Helmeted Guineafowl	*Numida meleagris*	28 14 21.30	14 47 07.44
13	Lilac-breasted Roller	*Coracias caudate*	28 20 28.90	14 47 35.22
14	Little Bee-eater	*Merops pusillus*	28 17 40.79	14 47 33.80
15	Lizard Buzzard	*Kaupifalco monogrammicus*	28 17 56.44	14 46 46.07
16	Miombo Grey Tit	*Parus griseiventris*	28 15 54.12	14 47 35.22
17	Miombo Rock Thrush	*Monicola angolensis*	28 18 34.20	14 46 19.71
18	Paradise Flycatcher	*Terpsiphone viridis*	28 15 51.77	14 46 24.70
19	Pied Crow	*Corvus albbus*	28 19 36.18	14 47 20.26
20	Red-eyed dove	*Streptopelia semitorrquata*	28 20 28.90	14 47 35.22
21	Reed Cormorant	*Phalacrocorax carbo*	28 14 18.45	14 47 28.25
22	Rufousbellied Tit	*Parus rufiventris*	28 20 37.45	14 47 47.33
23	Senegal Wattled lapwing	*Vanellus senegallus*	28 20 31.75	14 47 38.79
24	Tawny-flanked Prinia	*Prinia subflava*	28 17 45.05	14 48 16.54
25	Tropical Boubou	*Laniarius aethioipicus*	28 20 26.76	14 47 34.51
26	White stork	*Ciconia ciconia*	28 20 31.75	14 47 40.92
27	Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*	28 20 31.75	14 47 40.92

8 ANNEX 8: LIST OF REPTILES OBSERVED IN THE FARM AREA

Table 8-1 Reptiles observed during surveys

No.	Reptile Species	Longitude	Latitude
1	Rainbow skink	28° 21' 20".88	14° 46' 00".02
2	Bark Snake	28° 21' 20".31	14 °45' 42".26
3	Black-necked spitting cobra	28° 20' 59".11	14° 48' 00".37

No.	Mammal Species	Longitude	Latitude
1	Bush baby	28° 19' 36"	14° 47' 51".78
2	Vervet monkey	28° 19' 36"	14° 47' 51".78
3	African civet	28 °16' 07".97	14 °46' 18".94
4	Spring hare	28° 21' 20".88	14 °46' 01".17
5	Common duiker	28° 19' 21".10	14 °48 '06".11
6	Chacma baboon	28° 14' 04".75	14 °46' 38".42

9 ANNEX 9: PROPOSED HEALTH AND SAFETY POLICY

Occupational safety and health (OSH) policy will ensure that everyone (Worker and Employer is aware of their rights and responsibilities in relation to health and safety.

Improved occupational safety and health enhances productivity by reducing the number of interruptions in the construction process, reducing absences, decreasing the number of accidents and improving work efficiency. Employers and workers both have responsibilities and rights in relation to (OSH). A preventative approach to OSH is the best strategy to eliminate most workplace accidents, injuries, and diseases.

Managing safety at Work place

Effective safety programmes have several features in common. They manifest throughout organizations, from the highest offices of a general contractor to project managers, supervisors, union officials and workers on the job. Codes of practice are conscientiously implemented and evaluated. Costs of injury and illness are calculated and performance is measured; those that do well are rewarded, those that do not are penalized. Safety is an integral part of contracts and subcontracts. Everybody managers, supervisors and workers—receive general, site-specific and site-relevant training and re-training. Inexperienced workers receive on-the-job training from experienced workers. In projects where such measures are implemented, injury rates are significantly lower than on otherwise comparable sites.

Preventing Accidents and Injuries

Entities in the industry with lower injury rates share several common characteristics: they have a clearly defined policy statement that applies throughout the organization, from top management to the project site. This policy statement refers to a specific code of practice that describes, in detail, the hazards and their control for the pertinent occupations and tasks at a site. Responsibilities are clearly assigned and standards of performance are stated. Failures to meet these standards are investigated and penalties imposed as appropriate. Meeting or exceeding standards is rewarded. An accounting system is used that shows the costs of each injury or accident and the benefits of injury prevention. Employees or their representatives are involved in establishing and administering a programme of injury prevention. Involvement often occurs in the formation of a joint labour or worker management

committee. Physical examinations are performed to determine workers' fitness for duty and job assignment. These exams are provided when first employed and when returning from a disability or other layoff.

The entire work site is inspected on a regular basis and results are recorded. Equipment is inspected to ensure its safe operation (e.g., brakes on vehicles, alarms, guards and so on). Injury hazards include those associated with the most common types of lost-time injuries: falls from heights or at the same level, lifting or other forms of manual materials handling, risk of electrocution, and risk of injury associated with either highway or off-road vehicles, trench cave-ins and others. Health hazards would include airborne particles (such as silica, asbestos, synthetic vitreous fibres, diesel particulates), gases and vapours (such as carbon monoxide, solvent vapour, engine exhaust), physical hazards (such as noise, heat, hyperbaric pressure) and others, such as stress.

Preparations are made for emergency situations and emergency drills are conducted as needed. Preparations would include assignment of responsibilities, provision of first aid and immediate medical attention at the site, communication at the site and with others off the site (such as ambulances, family members, home offices and labour unions), transportation, designation of health care facilities, securing and stabilizing the environment where the emergency occurred, identifying witnesses and documenting events. As needed, emergency preparedness would also cover means of escape from an uncontrolled hazard such as fire or flood.

Accidents and injuries are investigated and recorded. The purpose of reports is to identify causes that could have been controlled so that, in the future, similar occurrences can be prevented. Reports should be organized with a standardized record-keeping system to better facilitate analysis and prevention. To facilitate comparison of injury rates from one situation to another, it is useful to identify the pertinent population of workers within which an injury occurred, and their hours worked, in order to calculate an injury rate (i.e., the number of injuries per hour worked or the number of hours worked between injuries).

Workers and supervisors receive training and education in safety. This education consists of teaching general principles of safety and health, is integrated into task training, is specific for each work site and covers procedures to follow in the event of an accident or injury. Education and training for workers and supervisors is an essential part of any effort to prevent injuries and disease. Training about safe work practices and procedures have been provided in many countries by some companies and trade unions. These procedures include lockout and tagout of electrical power sources during maintenance procedures, use of lanyards while working at heights, shoring trenches, providing safe walking surfaces and so on. It is also important to provide site-specific training, covering unique features about the job site such as means of entry and exit. Training should include instruction about dangerous substances. Performance or hands-on training, demonstrating that one knows safe practices, is much better for instilling safe behaviour than classroom instruction and written examination.

In Zambia, training about certain hazardous substances is mandated by law. Equally important, the programme provides the information in a form to suit the differing needs of health staff, managers and workers. The information is

available through training programmes, in print and on computer terminals at work sites.

Information about chemical, physical and other health hazards is available at the work site in the languages that workers use. If workers are to work intelligently on the job, they should have the information necessary to decide what to do in specific situations.

And finally, contracts between contractors and subcontractors should include safety features. Provisions could include establishing a unified safety organization at multi-employer work sites, performance requirements and rewards and penalties.

10 ANNEX 10: CHECK LIST FOR THE ECOLOGICAL ASSESSMENT

Table 10-1 Checklist of Mammals in Musakashi area

The Mammals	Common Name	Scientific Name	Status
1. Herbivores			
	Warthog	*Phacochoerus aethiopicus*	*Rare*
	Bush pig	*Potamochoerus porcus*	*Occasional*
	Common duiker	*Sylvicapra grimmia*	*Occassional*
2. Carnivores			
	Serval	*Felis serval*	*Rare*
	Caracal	*Felis caraca (rarely seen)*	*Rare*
	African wild cat	*Felis lybica*	*Rare*
	Side-striped jackal	*Canis adustus*	*Occasional*
3. Small game			
	African civet	*Civettictis civetta*	*Occasional*
	Large-spotted genet	*Ganetta tigrina*	*Fairly common*
	White-tailed mongoose	*Ichneumia albicauda*	*Occasional*
	Slender mongoose	*Galerella sanguineus*	*Common*
4. Primates			
	Chacma baboon	*Papio ursinus (south park)*	Common
	Vervet monkey	*Cercopithecus aethiops*	*Common*
	Bushbaby	*Otolemur crassicaudatus*	Occasional
	Lesser bushbaby	*Galago moholi*	Rare
	Common slit-faced bat	*Nycteris thebaica*	
	Hildebrandt's horseshoe bat	*Rhinolophus hildebrandti*	
	Horseshoe bat	*Rhinolophus simulator*	
	Schlieffen's bat	*Nycticeius schlieffeni*	
	Pipistrelle	*Pipistrellus nanus*	
	Kuhl's pipistrelle	*Pipistrellus kuhli*	
	Cape serotine bat	*Eptesicus capensis*	
	House bat	*Scotophilus nigrita*	
	Little free-tailed bat	*Tadarida pumila*	
5. Others			
	Porcupine	*Hystrix africaeaustralis*	
	Spring hare	*Pedetes capensis*	*Recorded in south of park*
	Mole rats	*Cryptomys spp.*	*Common*
	Fat mice	*Steatomys spp.*	*Common*
	Dormice	*Graphiurus spp.*	*Occasional*
	Hare	*Lepus saxatilis*	*Common*

11 ANNEX 11: CHECKLIST OF FISH IN MUSAKASHI AREA

PROTOPTERIDAE	*Protopterus annectens*	Lungfish
MORMYRIDAE	*Petrocephalus catostoma*	Churchill
	Marcusenius macrolepidotus	Bulldog
	Mormyrops deliciosus	Cornish Jack
	Mormyrops longirostris	Bottlenose
KNERIIDAE	*Kneria auriculata*	Southern kneria
ANGUILLIDAE	*Anguilla bengalensis labiate*	African mottled eel
	Anguilla marmorota	Madagascar mottled eel
CYPRINIDAE	*Barbus fasciolatus*	Red barb
	Barbus lineomaculatus	Line spotted barb
	Barbus marequensis	Large scale yellow fish
	Barbus paludinosus	Straight fin barb
	Barbus barotsecensis	Many spotted barb
	Barbus eutaenia	Thick striped barb
	Barbus manicensis	Plain barb
	Barbus viviparous	Twin striped barb
	Barbus radiatu	Red-eyed barb
	Labeo altivelis	Hunyani labeo
	Labeo congoro	Purple labeo
	Labeo cylindricus	Redeye labeo
	Varicorhinus nasutus	Shortsnout chiselmouth
CHARACIDAE	*Brycinus imberi*	Imberi
	Micralestes acutidens	Silver robber
	Hydrocynus vittatus	Tigerfish
DISTICHODONTIDAE	*Distichodus mossambicus*	Nkupe
	Distichodus schenga	Chessa
AMPHILIIDAE	*Leptoglanis rotudiceps*	Spotted sand catlet
	Amphilius platychir	? Mountain catfish
SCHILBEIDAE	*Schlibe mystus mystus*	Silver catfish
	Schilbe mystus depressirostris	Butter catfish
CLARIIDAE	*Clarias gariepinus*	Sharptooth catfish
	Clarias theodorae	Snake catfish
	Heterobranchus longifilis	Vundu

MOCHOKIDAE	*Chiloglanis neumanni*	Neumann's suckermouth catlet
	Synodontis zambezensis	Clouded squeaker
	Synodontis nebulosus	Brown squeaker
CYPRINODONTIDAE	*Aplocheilichthys johnstonii*	Johnston's topminnow
CICHLIDAE	*Oreochromis mossambica*	Mozambique tilapia
	Oreochromis macrochir	Greenhead tilapia
	Pharyngochromis acuticeps	Zambezi happy
	Pseudocrenilabrus philander	Southern mouthbrooder
	Sargochromis codringtoni	Green happy
	Tilapia sparrmanii	Banded tilapia
	Tilapia rendalli	Northern redbreast tilapia

12 ANNEX 12: CHECKLIST OF REPTILES IN MUSAKASHI AREA

Scientific Name	Common Name
SNAKES	
Dendroaspis polylepsis	Black mamba
Hemirnagerrhis nototaenia	Bark snake
Rhamphiosis oxyrynchus	Rufous beaked snake
Psammophis phillipsii	Olive grass snake
Psammophis subtaeniatus	Stripe bellied sand snake
Psammophis angolensis	Dwarf sand snake
Dispholidus typus	Boomslang
Thelotornis capensis	Vine (twig) snake
Dasypeltis scabra	Common egg eater
Boaedon fuliginosus	Common house snake
Natriciterea Olivacea	Olive marsh snake
Philothamnus hoplogaster	Eastern green snake
Philothamnus semivariegatus	Spotted bush snake
Python sebae	African rock python
Typhlops schlegelii	Blind snake
Attractaspis bibronii	Burrowing adder
Bitis arientans	Puff adder
Causus rhombeatus	Rhombic night adder
OTHER REPTILES	
Agama atricollis	Tree (blue headed) agama
Agama kirkii	Kirk's rock agama
Mabuya striata	Striped skink
Ichnotropis squamulosa	Common rough scaled lizard
Varanus exanthematicus	Rock monitor
Varanus niloticus	Nile monitor
Lygosoma sundvevalii	Writhing skink
Pachydactylus bibronii	Bibron's gecko
Lygodactylus chobiensis	MALdwarf gecko
Hemidactylus mabouia	Tropical house gecko
Geochelone pardalis	Leopard tortoise
Pelusios sinuatos	Serrated hinged terrapin
Chamaeleo dilepsis	Flap necked chamaeleon

13 ANNEX 23: CHECKLIST OF BIRDS IN MUSAKASHI AREA

1	Little Grebe			94	Ayre's Hawk Eagle
2	White-breasted Cormorant			95	Long-crested Eagle
3	Reed Cormorant			96	Martial Eagle
4	Darter	51	Cape Teal	97	Osprey
9	Black-crowned Night Heron	56	Northern Shoveler	102	Dickinson's Kestrel
10	White-backed Night Heron	57	Cape Shoveler	103	Western Red-footed Falcon
11	Common Squacco Heron	58	Southern Pochard	104	Eastern Red-footed Falcon
12	Madagascar Squacco Heron	59	African Cuckoo Hawk	105	Red-necked Falcon
13	Rufous-bellied Heron	60	Honey Buzzard	106	European Hobby
14	Cattle Egret	61	Bat Hawk	107	African Hobby
15	Green-backed Heron	62	Black-shouldered Kite	108	Sooty Falcon
16	Black Egret	63	Yellow-billed Kite	109	Lanner Falcon
17	Slaty Egret	64	African Fish Eagle	110	Peregrine Falcon
18	Little Egret	65	Hooded Vulture	111	Coqui Francolin
19	Yellow-billed Egret	66	White-backed Vulture	112	Crested Fraancolin
20	Great White Egret	67	Cape Vulture	113	Natal Francolin
21	Purple Heon	68	Lappet-faced Vulture	114	Swainson's Francolin
22	Grey Heron	69	White-headed Vulture	115	Common Quail
25	Hamerkop	71	Brown Snake Eagle	118	Helmeted Guineafowl
26	Yellow-billed Stork	72	Western Banded Snake Eagle	119	Kurrichane Buttonquail
27	Openbill Stork	73	Bateleur	120	Black-rumped Buttonquail
28	Black Stork	74	Gymnogene	121	Buff-spotted Flufftail
29	Abdim's Stork	75	European Marsh Harrier	122	Red-chested Flufftail
30	Woolly-necked Stork	76	African Marsh Harrier	123	Streaky-breasted Flufftail
31	White Stork	77	Pallid Harrier	124	African Water Rail
32	Saddle-billed Stork	78	Montagu's Harrier	125	Com Crake
33	Marabou Stork	79	Dark Chanting Goshwk	126	African Crake
34	Sacred Ibis	80	Gobar Goshawk	127	Black Crake
35	Glossy Ibis	81	Black Goshawk	128	Baillon's Crake
36	Hadada	82	Ovambo Sparrowhawk	129	Spotted Crake
37	African Spoonbill	83	Little Sparrowhawk	130	Striped Crake
38	Greater Flamingo	84	African Goshawk	131	Purple Gallinule
39	Lesser Flamingo	85	Shikra	132	Lesser Gallinule

40	Fulvous Whistling Duck	86	Lizard Buzzard	133	Common Moorhen
41	White-faced Whistling Duck	87	Common (Steppe) Buzzard	134	Lesser Moorhen
42	Whie-backed Dock	88	Wahlberg's Eagle	135	Red-knobbed Coot
43	Egyptian Goose	89	Lesser Spotted Eagle	136	Wattled Crane
44	Spur-winged Goose	90	Tawny Eagle	137	Southern Crowned Crane
45	Knob-billed Duck	91	Steppe Eagle	138	Denham's Bustard
46	African Pygmy Goose	92	African Hawk Eagle	139	White-bellied Bustard
47	African Black Duck	93	Booted Eagle	140	Black-bellied Bustard
141	African Jacana	190	White-winged Black Tern	238	Red-faced Mousebird
142	Lesser Jacana	191	Afrian Skimmer	239	Narina Trogon
143	Painted Snipe	192	Yellow-throated Sandgrouse	240	Half-Collared Kingfisher
144	Black-winged Stilt	193	Laughing Dove	241	Malachite Kingfisher
145	Avocet	194	African Mourning Dove	242	Pygmy Kingfisher
146	Water Dikkop	195	Cape Turtle Dove	243	Brown-headed Kingfisher
147	Spotted Dikkop	196	Red-eyed Dove	244	Chestnut-bellied Kingfisher
148	Three-banded Courser	197	Emerald-spotted Wood Dove	245	Senegal Kingfisher
149	Bronze-winged Courser	198	Namaqua Dove	246	Striped Kingfisher
150	Temminck's Courser	199	Green Pigeon	247	Giant Kingfisher
151	Common Pratincole	200	Brownnecked Parrot	248	Little Bee-eater
152	Black-winged Pratincole	201	Meyer's Parrot	249	White-cheeked Bee-eater
153	Ringed Plover	202	Schalow's Turaco	250	Swallow-tailed Bee-eater
154	Kittlitz's Plover	203	Grey Lourie	251	White-fronted Bee-eater
155	Three-banded Plover	204	Great Spotted Cuckoo	252	Bohm's Bee-eater
156	White-fronted Sand Plover	205	Jacobin Cuckoo	253	Madagascar Bee-eater
157	Mongolian Plover	206	Striped Crested Cuckoo	254	Blue-ckeeked Bee-eater
158	Caspian Plover	207	Red-chested Cuckoo	255	European Bee-eater
159	Pacific Golden Plover	208	Black Cuckoo	256	Southern Carmine Bee-eater
160	Grey Plover	209	European Grey Cuckoo	257	European Roller
161	Senegal Wattled Plover	210	African Grey Cuckoo	258	Lilac-breasted Roller
163	Crowned Plover	212	Klaas's Cuckoo	260	Purple Roller
164	Long-toed Plover	213	Didric Cuckoo	261	Broad-billed Roller
165	Ethiopian Snipe	214	African Black Coucal	262	Red-billed Wood Hoopoe
166	Great Snipe	215	Coppery-tailed Coucal	263	Scimiterbill
167	Black-tailed Godwit	216	Senegal Coucal	264	Hoopoe
171	Spotted Redshank	219	Grass Owl	268	Afrian Grey Hornbill
172	Common Redshank	220	African Scops Owl	269	Trumpeter Hornbill
173	Marsh Sandpiper	221	White-faced Owl	270	Southern Ground Hornbill
174	Greenshank	222	Spotted Eagle Owl	271	Yellow-fronted Tinkerbird
175	Green Sandpiper	223	Giant Eagle Owl	272	Miombo pied Barbet
176	Wood Sandpiper	224	Pearl-spotted Owlet	273	Black-collared Barbet
177	Terek Sandpiper	225	Wood Owl	274	Chaplin's Barbet
178	Common Sandpiper	226	Marsh Owl	275	Black-backed Barbet
179	Turnstone	227	European Nightjar	276	Crested Barbet
180	Sanderling	228	Rufous-ckeeked Nightjar	277	Greater Honeyguide
181	Little Stint	229	Fiery-necked Nightjar	278	Lesser Honeyguide
182	Pectoral Sandpiper	230	Natal Nightjar	279	Bennett's Woodpecker
183	Curlew Sandpiper	231	Freckled Rock Nightjar	280	Golden-tailed Woodpecker
184	Ruff	232	Gaboon (Mozambique) Nightjar	281	Cardinal Woodpecker
185	Lesser Black-backed Gull	233	Pennant-winged Nightjar	282	Bearded Woodpecker
186	Grey-headed Gull	234	African Palm Swift	283	African Broadbill

187	Gull-billed Tern	235	European Swift	284	Rufous-naped Lark
188	Caspian Tern	236	Little Swift	285	Flappet Lark
189	Whiskered Tern	237	African White-rumped Swift	286	Dusky Lark
287	Red-capped Lark	336	Great Reed Warbler	385	Red-backed Shrike
290	European Sand Martin	339	Olive-tree Warbler	388	Magpie Shrike
291	African Sand Martin	340	Lecterine Warbler	389	Brubru
292	Banded Martin	341	Green-capped Eremomela	390	Southern Puffback
295	Mosque Swallow	344	Long billed Crombec	393	Tropical Boubou
296	Lesser Striped Swallow	345	Willow Warbler	394	Orange-breasted Bush Shrike
297	African Rock Martin	346	Garden Warbler	395	Grey-headed Bush Shrike
298	Wire-tailed Swallow	347	Common Whitethroat	396	White Helmet Shrike
299	White-throated Swallow	348	Pectoral-patch Cisticola	397	Retz's Red-billed Helmet Shrike
300	European Swallow	349	Fan-tailed Cisticola	398	Fork-tailed Drongo
301	House Martin	350	Desert Cisticola	399	Pied Crow
302	Yellow Wagtail	351	Croaking Cisticola	400	Greater Blue-eared Starling
303	Cape Wagtail	352	Rattling Cisticola	401	Lesser Blue-eared Starling
304	African Pied Wagtail	353	Short-winged Cisticola	402	Southern Long-tailed Starling
305	Richard's Pipit	354	Neddicky	403	Violet-backed Starling
306	Long-billed (Wood) Pipit	355	Red-faced Cisticola	404	Wattled Starling
307	Plain-backed Pipit	356	Greater Black-baked Cisticola	405	Yellow-billed Oxpecker
308	Buffy Pipit	357	Tawny-flacked Prinia	406	Red-billed Oxpecker
309	Tree Pipit	358	Yellow-breasted Apalis	407	House Sparrow
310	Fulleborn's Longelaw	359	Bleating Bush Warbler	408	Grey-headed Sparrow
311	Rosy-breasted Longelaw	360	Miombo-barred Warbler	409	Southern Grey-headed Sparrow
312	Black Cuckoo-shrike	361	Pallid Flyeatcher	410	Yellow-throated Petronia
313	White-breasted Cuckoo-shrike	362	Southern Black Fkyeatcher	411	White-browed Sparrow-weaver
314	Yellow-belloed Greenbul	363	Collared Flyeatcher	412	Spectacled Weaver
315	Terrestrial Bulbul	364	Spotted Flyeatcher	413	Lesser Masked Weaver
316	Common Bulbul	365	Swamp Flyeatcher	414	African Masked Weaver
317	Kurrichane Thrush	366	Ashy Flyeatcher	415	Village Weaver
318	Groundscraper Thrush	367	Lead-coloured Flyeatcher	416	Red-headed Weaver
319	Thrush-Nightingale	368	Chinspot Batis	417	Red-headed Quelea
320	Heuglin's Robin	369	Paradise Flyeatcher	418	Red-billed Quelea
321	Red-capped Robin	370	Arrow-marked Babbler	419	Yellow-crowned Bishop
322	Collared Palm Thrush	371	White-romped Babbler	420	Black-winged Red Bishop
323	Eastern Bearded Scrub Robin	372	Southern Black Tit	421	Red Bishop
324	White-browed Scrub Robin	373	Grey Penduline Tit	422	Yellow Bishop
325	Stonechat	374	Collared Sunbird	423	Red-shouldered Whydah
326	European Wheatear	375	Amethyst Sunbird	424	Yellow-mantled Whydah
327	Capped Wheatear	376	Scarlet-chested Sunbird	425	White-winged Whydah
328	Familiar Chat	377	Yellow-bellied Sunbird	426	Parasitic Weaver
329	Sooty Chat	378	White-bellied Sunbird	427	Melba Finch
330	Arnot's Chat	379	Purple-banded Sunbird	428	Orange-winged Pytilia
331	Little Rush Warbler	380	Copperry Sunbird	429	Red-throated Twinspot
332	River Warbler	381	Yellow White-eye	430	Brown Firefinch
333	Sedge Warbler	382	European Golden Oriole	431	Red-billed Firefinch
334	Reed Warbler	383	African Golden Oriole	432	Jamesons's Firefinch

335	Marsh Warbler	384	Eastern Black-headed Oriole	433	Common Waxbill
434	Blue Waxbill	441	Cut-throat Finch	448	Long-tailed Paradise Widow
438	Quail Finch	445	Pale-winged Lodignbird	452	Cinnamon-breasted Rock Bunting

14 ANNEX 34: MINUTES OF MEETINGS WITH STAKEHOLDERS

MINUTES OF THE CONSULTATIVE MEETING HELD IN MUSAKASHI ON 20TH DECEMBER 2012

14.1 Introductions

The meeting was held on the 20th December 2012. It begun at 10:30hrs with a prayer and the National Anthem. This was followed by Mr Nyundu's (Chairman) welcoming remarks. He further took recognition of the presence of the distinguished guests and officials that were present after introducing himself.

14.2 Purpose of the meeting

Mr. Nyundu outlined the agenda for the meeting and explained the purpose of the meeting. He went on to state the specific objective of the meeting as to inform the general public about the proposed IDSP project and its implications. Mr. Nyundu stated that he was aware that other groups of consultants had already introduced the project to the community in the past and further explained that the meeting marked the starting point towards implementation of the IDSP project. He further informed people in attendance that the meeting provided an opportunity for them to state among other factors what they felt was of concern to their well-being or indeed issues that needed attention prior to implementation of the project.

He explained the scope, extent and focus of the project saying that it will be based on the principle of public private partnership. Furthermore, he went on to stated that the meeting provided a forum for all stakeholders to get full project details while at the same time exchange information that would be relevant to the smooth implementation of the project. He further urged people to freely express themselves during the deliberations. He urged everyone present not to interrupt or interject while someone was on the floor making a submission.

14.3 Plenary discussion

This section outlines questions, clarifications and general opinions expressed by the community and responses.

Q. Mr. Pasco Bwalya wanted to know why people have continued attending such meetings saying that people already know a lot about the project from previous meetings. He stated that people were instead anxious to know when the project will start.

In response, he was told that it was important that people were aware of every step at which the project was and follow up actions to avoid misunderstandings. He was further informed that the meeting was to mark the beginning of the ESIA study that will lead to the implementation of the project.

Q. Christine Chipanta: Wanted to know whether those that will be moved from the land they currently occupy will be given title deeds to the new piece of land that they will be allocated to them.

In response, she was told that issues of titles will be dealt with by the relevant authorities and that title deeds to pieces of land given to individuals will be given. However, for land under tier 3, the people will simply be shareholders and land will be held in community trust.

Q. Mr George Muhango: Wanted to know what will happen when people are moved since schools going children will be located far from current schools?

In response, Mr. Nyundu said that the project will ensure that people will have safe drinking water and all social amenities wherever they will be moved if such facilities will be affected. Besides, he said that people will be compensated in one form or another.

Q Mr. Chibwipa Luckson Ngongo: Challenged the meeting that although people are poor in thinking and sometimes lazy, there is need to remove self-imposed poverty. He said to achieve this people need to welcome initiatives such as the proposed IDSP project.

In response, Mr Chibwipa was told that the project is meant to benefit the local people and it was good to note that some community members already realized this fact. In addition, the District Commissioner said that the project will only work well if people work together and cited Genesis 11 where God encourages people to work together.

Q. Joyce Mubanga: Said that she was one of the people to undertook a field visit to some of the projects of similar nature that have been implemented in other parts of the country. She attested to the fact that people are happy in these areas because the projects have improved their wellbeing. She urged fellow community members to welcome the project as it will change their wellbeing.

Q. Ms Getrude Mumba: Wanted to know if the project will build houses for the people that will be resettled like other projects have done in other parts of the country.

In response, she was informed that the principle behind the project and those who will be displaced is that they have to continue with their lives as before or even better. So when it comes to resettlements modalities of doing so will be worked out in consultations with the communities themselves and agreed upon.

Q. Ms Esnart Pande: Expressed concern that some people have a lot of animals and wondered whether if resettlement measures will be put in place to ensure that such people are not disadvantaged

In response, she was informed that there will be a dedicated exercise for resettlement issues during which all issues of concern will be addressed by all concern parties. Therefore, the issue of animals and grazing land will be dealt with to conclusion at that time. However, the issue has been noted.

Q. Mr. Nyendwa: expressed concern as to what will happen to the flora and fauna due to the proposed project considering that tier 3 will constitute big plots of lands of more than 60ha

In response, Mr. Nyundu stated that the aim of the ESIA study was to look at all aspects relating to biophysical and biological as they will be affected by the project. He further said that the study will advise on the best measures to take in addressing these issues based on expert judgement and consultations with the community.

Q. Ms Getrude Mulenga: expressed concern that people to be resettled will benefit a great deal but what about the host community will there be any benefit to them

In response Mr. Nyundu said that benefits associated with the proposed project will in general benefit all community members regardless whether they are being displaced or not. He cited the fact that the road in the area once rehabilitated will benefit all the people in the area and not only those to be resettled

Q. Mr Chipipa Ngombo implored the project not to allocate land of no agricultural value to the people that will be displaced since it will bring misery to the people.

In response, Mr Chipepa was informed that before people are moved to the new area, the area will be assessed as well t ensure that its habitable and has social amenities such as portable water.

Remarks by the District Commissioner

The district commissioner informed the people that the 500ha targeted for irrigation was just for phase 1. He said that should the project work well, the scheme will be up scaled and more land will be required. She reminded the people that there are several sites across the country that could have benefited from the phase 1 of the project but only three sites were chosen including Musakashi. So people needed to know that they are lack to be chosen for phase 1 and must work hard to ensure the project works. Being pioneers of the project, she said it was a big responsibility for the people of Musakashi because the up scaling of the irrigation schemes to other parts of the country was dependent on how well the project works out in Musakashi and the other two sites. She urged all the people to support the project as it will improve their livelihood

In conclusion the District Commissioner thanked the people in attendance and encouraged them to work together saying everyone is equal in the eyes of God. She noted that the IDSP project was like a gift from God and urged people not to stay away from future meetings. She urged the people to continue attending meetings all the time you are called upon so that everyone is in tandem with the stages the project was.

Closing Remarks

Mr. Nyundu thanked everyone for actively participating in the deliberations. He stated that other experts will soon come to the area and the people should welcome them. The meeting closed at 14:11hours with a prayer and National Anthem.

LIST OF PARTICIPANTS FOR THE SCOPING MEETING FOR THE IDSP PROJECT MUSAKASHI SITE HELD ON 20TH DECEMBER 2012 IN MUFULIRA

NO	NAME	CONTACT	ORGANISATION/ ENTITY	SIGNATURE	NO	NAME	CONTACT	ORGANISATION/ ENTITY	SIGNATURE
1	BONIFACE KASESA	NIL	KABANANA		61	VERA NAMUKONDA	NIL	ULIMBE	
2	ADWARD BWALYA	NIL	KAPOLOPOLO		62	MULULA EPILOUS PAUL+B81	NIL	KANGWENA	
3	ENGELEZI ZULU	NIL	KAPOLOPOLO		63	VAILETI NAMUKWASA	NIL	ULIMBE	
4	JAKISON CHELA	NIL	NDELI		64	SLIVA SIMUWELU	NIL	ULIMBE	
5	BERTHA NGOMA	NIL	AKABANGIRE		65	THERESA M. MAKULATA	260977931335	ULIMBE	
6	MARY MBEWE	NIL	AKABANGIRE		66	MARY SALINI	NIL	KANGWENA	
7	LAILA MUNSANJE	NIL	AKABANGIRE		67	MARY KACHASA	NIL	KANGWENA	
8	JOHN NKONDE	260978092740	KANGWENA		68	IREENE MUBUYAETA	NIL	KANGWENA	
9	JULIUS NGANIJU	260962078867	KANGWENA		69	MAIKA LUFUKA	NIL	KANGWENA	
10	BEAUTY CHILUFYA	NIL	KABANANA		70	MUKATA CHIPANGO	NIL	KANGWENA	
11	ESNATE P. MWAPE	NIL	KABANANA		71	BISE NAWILA	NIL	KANGWENA	
12	ELIZABETH CHANDA	NIL	NSOBU		72	ANGELA NAKANIKA	NIL	KANGWENA	
13	LOSE SAKALIMBA	NIL	KABANANA		73	HILDA NAKANBA	NIL	SHANGILA	
14	GENUDE MONDE	NIL	KAPOLOPOLO		74	AGNESS NAMONJE	NIL	SHANGILA	
15	ELIZABETH MPANYANI	NIL	KAPOLOPOLO		75	FRIWELL SEMLIMA	NIL	MUSAKASHI	
16	LISECAZ MUMBA	NIL	KAPOLOPOLO		76	CHABU CHALLA	NIL	MUSAKASHI	
17	JOICE MWITABA	NIL	KAFUE		77	HARRY NYINBILI	NIL	SIKANYIKA	
18	JOYCE KANSHIKO	NIL	KAPOLOPOLO		78	DINESS NKONDOWE	NIL	SIKANYIKA	
19	BEAUTY MATIPA	NIL	MUSAKASHI		79	JOHONA MWEWA	NIL	SIKANYIKA	
20	MARTHA N. KAPELA	26977111414	KANGWENA		80	CHARITY MWANSA	NIL	SIKANYIKA	
21	JOICE MUBANGA	260979208878	KANGWENA		81	MARRIAN SOBANGO	NIL	PHIRIS ZONE	
22	RAPHEAL NG'ANDWE	260979277475	KOVINA ZONE		82	GRACE MULENGA	NIL	PHIRIS ZONE	
23	WELINGTON MWANSA	NIL	KOVINA ZONE		83	MUSONDA JESOPH	NIL	SIKANYIKA	
24	GEORGE MUHANGA	260972751397	KOVINA ZONE		84	OKIKASAKA	NIL	SIKANYIKA	
25	SAFELI LASON	NIL	SINKANIKO		85	GETRUDE MULENGA	260977101807	MUSAKASHI	
26	LUKA SIFUKWE	NIL	KAPOLOPOLO		86	EDINA BWALYA	260977857354	KANGWENA	
27	WILLISON MWAPE	260965686247	PHIRIS		87	PATRICK NG'AMBI	260973430319	MUSAKASHI	
28	POSTAN PHIRI	NIL	SINKANIKO		88	VISTO K. MPUNDU	NIL	KAFUE	
29	ENOCK MUSAMBA	260968014611	SINKANIKO		89	REAGAN SIFAYA	260964225527	MUSAKASHI	
30	ROBERN KAJIKO	260966882889	KAPOLOPOLO		90	THOMAS MUNSAKA	260976879618	KAFUE	
31	LUKA MUSOLE	NIL	KOVINA ZONE		91	KABUNGO PROSPER	NIL	KAFUE	
32	SHADRICK SEMENT	260963472553	SINKANIKO		92	CHIPIPA L NGOMBO	NIL	KAPOLOPOLO	
33	JASTIN KABWE	260969160979	PHIRIS		93	GEORGE CHINYIMBA	260968550688	KAFUE	
34	KENNEDY SINKAMBALE	260963950005	KOVINA ZONE		94	CHANZI BOSTON	260976367084	SULUNGWE	
35	JOSEPH CHISWEKA	260977521903	KOVINA ZONE		95	PASCAL BWALYA	NIL	KANGWENA	
36	MONLY SINKENDE	260967799401	MUSAKASHI		96	MARTIN MULENGA	260754431115	NSOFU	
37	NORWAH SIUKANIKA	NIL	SHANGILA ZONE		97	KASONDE CHISANGA	260965781216	MUSAKASHI	
38	CHRISTEN CHIPANTA	260979297766	SHANGILA ZONE		98	BEAMICE MITI	NIL	MUSAKASHI	
39	INNOCENT SIFAYA	260963613750	MUSAKASHI		99	GRACE NSOFU	NIL	KAPOLOPOLO	
40	EZERBET KACHWGA	NIL	MUSAKASHI		100	MARY MWEWA	NIL	KAPOLOPOLO	
41	MERCY MULENGA	260963456091	MUSAKASHI		101	MWANGALA MUTUKWA	260977108935	KAFUE	
42	MISHEKI LANGENI	260974803114	KAPOLOPOLO		102	MOSES WAMUKWAMBA	NIL	KAFUE	
43	ESTON SIMBEYE	260973365909	KANGWENA		103	ANDREW MUMBA	260979187601	KAPOLOPOLO	
44	CONATANTINE M. MWESA	260977895244	MUSAKASHI		104	AMON KATENDE	260974812258	KAFUE	
45	COSMAS MAYONDI	260962240332	MUSAKASHI		105	JOB CHONGO	NIL	KABANANA	
46	NOANAN	NIL	ULIMBE		106	LUKA MUSONDA	NIL	KAPOLOPOLO	
47	MARTIN SIWALE	260911556561	KABANANA		107	JOSEPH MWANZA	NIL	KAPOLOPOLO	
48	EDWARD MWELWA	NIL			108	DEVED KABASO	NIL	KAPOLOPOLO	
49	CHANDA WEBBY	NIL	ULIMBE		109	MPANGANI THOMSON	NIL	KAPOLOPOLO	
50	ANDREW MUBANGA	NIL	ULIMBE		110	EVANS MUSONDA	260963213786	TUBOMBESHE	
51	DICKSON KASENGO	260977649096	KAPOLOPOLO		111	VIOLET KATENDE	NIL	KAFUE	
52	JAMES KALOKI	NIL	KAPOLOPOLO		112	JOHN SIMUKOKO	NIL	SHANGILA	
53	DAVID MWANSA	260966052587	ULIMBE		113	TADEO KABASO	260976180698	KAPOLOPOLO	
54	JONES SIMUKONDA	26096728735	ULIMBE		114	PETER KAYUNGULU	NIL	KAPOLOPOLO	
55	EPHRAIM MBAU	260961981336	ULIMBE		115	PAUL KAUNDA	NIL	KAPOLOPOLO	
56	IVOR CHILUBA CHALANBI	260969994585			116	TIMOTHY MAKINA	260979199844	SHANGILA	
57	KALUMBA CHONGO	260965296494			117	CHRISTOPHER MOPSOLE	260975834333	SHANGILA	
58	EMALL SIMBEYE	NIL	ULIMBE		118	EVARISTO MWEWA BWALYA	NIL	SHANGILA	
59	SUNDAY KANYIKA	260963593053	ULIMBE		119	PETER MUTEBA	260976013095	KABANANA	
60	OLITA NANYILONGO	NIL	ULIMBE						

15 ANNEX 15 MINUTES OF THE DISCLOSURE MEETINGS

15.1 Introduction

The Environmental and Social Impact Assessment (ESIA) Public Disclosure Meetings were held at all three IDSP Group 1 sites in July 2014 following written notices given to targeted stakeholders and to the general public through the national print media (See extract from one of the daily newspaper in the annex). . The purpose of making the ESIA draft reports public was; to disclose the outcomes of the Environmental and Social Impact Assessment studies conducted at the three sites; and to seek public input on the recommendations of the ESIA before finalization of the draft ESIA reports.

The disclosure meeting at Musakashi site was held at Zambian Research Institute (ZARI) on the 18thof July 2014 and was attended by interested and affected stakeholders that included the local community, representatives of the District Council, traditional leaders, the District administration and the Ministry of Agriculture and Livestock among others (See attendance list in the annex).

15.2 Opening remarks

The National IDSP Coordinator, Dr. Barnabas MULENGA, gave the opening remarks and reminded participants of the importance of the Public Disclosure Meeting to IDSP as a statutory requirement aimed at satisfying Zambia Environmental Management Agency (ZEMA) and safeguard policies for Word Bank. He called upon all participants to fully participate and express themselves freely on the contents and outcomes of the ESIA. He then called upon the Permanent Secretary of the Ministry of Agriculture and Livestock, Mr. J. Shawa, to officially open the disclosure meeting.

In his address, The Permanent Secretary spoke to underscore the key role irrigation can play in agriculture. He went on to state that Zambia had abundant water resources which were yet to harnessed and developed. Despite this the country still lagged behind in the utilization of land under irrigation. Hence Government through Ministry of Agriculture and Livestock sourced funds to develop irrigation schemes. He cited Mwomboshi, Musakashi and Lusitu as the three irrigation schemes that are earmarked for development under phase one. He alluded to the fact construction of irrigation schemes at the three sites would

contribute to effective utilization of water resources consequently increase land under irrigation. He reaffirmed Government commitment to quicken the process of ensuring smooth operation of the schemes. But he pointed out that Government will observe all procedural requirements such the ESIA in a transparent manner to ensure that development is sustainable. He called upon the Ministry to follow a cost effective approach in sourcing services for the development of the scheme. In conclusion he called upon all participants to freely participate in order to realize the objectives of the meeting.

15.3 Proceedings

Presentation of the ESIA

The ESIA Team Leader Mr Kenneth NYUNDU informed the stakeholders in attendance that the purpose of the disclosure meeting, stating that it was a very important step in the consultative process of the ESIA development. He explained that following the production of the draft ESIA report and prior to submission of the ESIA report to the competent authority, it was a requirement that the findings of the ESIA study and recommendations contained therein are made public to all stakeholders, interested and affected parties. This was aimed at ensuring that the findings and recommendations of the ESIA study are based on factual information and representative of the aspirations of the stakeholders as part of the transparent consultative process.

In his presentation, he gave a brief summary on the project background highlighting its objectives, scope and rationale. He explained that the underlying principle of the IDSP project is based on a partnership arrangement between the Government, private operators and communities. He further went on to explain the key features of the project as being irrigation facilities and associated support infrastructure. He elaborated on beneficiary and targeted groups for the project.

Furthermore, he outlined the contents of the ESIA report citing all relevant sections of the report and their relevance. He went on to elaborate on the approach that the ESIA team used in developing the report, the ESIA study objectives and issues that were captured during consultative meetings with stakeholders as well as the findings of the ESIA study. Based on the findings and conclusions drawn on all relevant subject matters of the ESIA, the stakeholders were informed that the ESIA team identified positive and negative impacts. These were further characterized based on their magnitude, extent, significance and timing. Cumulatively their effects were analyzed during the study and he disclosed recommendations and or mitigation measures stated in the ESIA aimed at avoiding or minimizing such effects. He also elaborated on the environmental management tool of these effects in form of an environmental management and monitoring plan as contained in the ESIA report.

In conclusion, he informed the meeting that it was the opinion of the ESIA study team that social economic and environmental impacts from the proposed project can effectively be managed and reduced to acceptable levels as long as proposed measures are implemented. Consequently, the benefits arising from operations of Musakashi Irrigation Scheme as a developmental project outweigh environmental costs. After the presentation, the ESIA Team Leader invited the participants to arise any issues.

15.4 Plenary Discussion

- Mr. J. SHAWA, Permanent Secretary of MAL wanted to know the proposed mitigation for safety of people from crocodiles in the Kafue River. In response, Mr Kenneth Nyundu, ESIA Team Leader said that people needed to co-exist with wildlife including crocodiles. He reminded the participants that the Kafue River is a natural habitat for crocodiles. However, under the proposed irrigation scheme, water will be pumped directly from the river to the upland within the scheme and stored in reservoirs. Therefore people working in the scheme will not be in contact directly with the Kafue river hence minimizing the risk of crocodile attacks. Nonetheless, the project will conduct awareness among the community on the dangers of crocodiles.
- Dr. MUTESA, Former District Commisioner for Mufulira wanted to know what measures will be put in place to safeguard all the planned new infrastructures and equipment under Tier 3. In response, Mr Kenneth Nyundu, ESIA Team Leader said that the scheme will be run commercially and professionally by a corporate farming company which will take in account the security of the equipment. In addition, the police post that already exists in the area will be reinforced.
- Mr Misheck Chiwele, Senior Agriculture Officer (SAO) wanted to know what measures will be put in place to protect crops from being destroyed by hippos in the area. Mr Kenneth Nyundu, ESIA Team Leader said the ESIA Team has proposed two solutions; one is to put an electrical fence and the other is for the MAL to ensure a permanent presence of Zambia Wildlife Authority (ZAWA) officers in the area.
- Mr Piphias Mubanga, Musakashi Farmer, disagreed with the conclusion of the study that stated that the assessment the Kafue River water showed that the water was not polluted and referred to his past experience saying at one time when he watered his vegetables with the water from the Kafue the vegetables got scotched. In response Mr Kenneth Nyundu ESIA Team Leader said that the ESIA findings showed that on average the quality of the water is good enough to practice irrigation because no single parameter tested was above allowable limit. He further informed the meeting that heavy metals have a tendency of precipitating and settle within sediments at the bottom of the river and due to seasonal variations there was a likelihood of re-cycling of the pollutants. And referring to the scotching of vegetables, he said that there was a likelihood that at that time there should have been emissions of Sulphur Dioxides from the mines in the air which could have formed acid that affected the vegetables. He further added that the mines have since taken measures to avoid emissions.
- Mr Charles K. Chileya, Investment Support Fund (ISFA) retaliated that the question of water quality should be taken seriously and needed more attention. He called upon the MAL to work together with ZEMA and Mining companies and ensure that the water in the Kafue remains unpolluted.
- Mr G. C. Dabali, Meteorologist at Musakashi wondered were the ESIA team got the meteological data from as he did not remember meeting any ESIA team member. In response, Mr Kenneth NYUNDU, ESIA Team Leader informed Mr Dabali that the ESIA team got their information from the central Metrological Headquarters database that covers the whole country including Musakashi.
- Mr Zakeyo Kamanga, District Administration Officer Mufulira wanted to know if silting will be an issue for the proposed irrigation scheme. In response, Mr

Kenneth Nyundu, ESIA Team Leader said that silting is not desired and the engineers designing the scheme have taken this into account by allowing for proper drainage and also through capacity building farmers will stick to good farming practices.

- Mr Peter Hanzooma, Musakashi Farmer/ PPSC member wanted to know how he will be compensated when his crops are damaged due to bad quality of water. Mr Kenneth Nyundu, ESIA Team Leader said that the study attached great importance to the issue of water quality. Facts on the ground indicated that water in the Kafue river was of good quality and fit for irrigation. He further stated that the mining companies in the area have informed the general public through the media that they have put measures in place to avoid reoccurrence of spills like before. And the outcome of the laboratory tests just confirmed this fact.
- Mr Lazarous Sinyinza, Environmental Officer-NFCA wanted to know if the ESIA report will be made available to the public on MAL website. He also wanted to know when implementation of the project would start and what the payback period was. In response Dr. Barnabas Mulenga, National IDSP Co-ordinator informed the meeting that the website for MAL has just been upgraded and would be completed soon. Regarding the project construction he said that actual physical implementation will start before the end of the year with construction of access road, power installation and housing units building for the affected communities. He said that the engineering consultant team are expected to finish the designs by September 2014 and a tendering process will then be initiated. He said that the payback period is 50 years.
- Mr Peter Hanzoma, Musakashi Farmer, PPSC member observed that the presence of the mining company NFCA representative in the meeting was encouraged but wondered why the other company Mopani was not represented. In response, Dr. Barnabas Mulenga, National IDSP Co-ordinator said that the invitation to attend the disclosure meeting was extended to all mining companies and there was no reason given for the absence of Mopani representative.
- Mr Melvin Mukela, Public Relations Officer, Mufulira District Council representative informed the meeting that the dialogue among the local authorities, the Government and Mopani over air emissions has been going on and that Mopani mine has committed itself to building an acid plant to limit air emissions. He added that Mopani Copper Mines (MCM) got approval to build the acid plant at its Mufulira based copper operations as part of on-going smelter upgrading projects. The plant is expected to double capacity to a total of 850,000 tons per year, and reduce sulphur dioxide emissions by as much as 95 percent.
- Mr Edward Phiri Musakashi Block Officer- Mufulira MAL wanted to know what measures will be put in place to avoid bush fires. In response, Mr Kenneth Nyundu, ESIA Team Leader said that the practice will not be encouraged. He informed Mr Phiri that the capacity building and awareness that the project has embarked on will promote good sound agricultural practices and people will be made aware of the dangers of bush fires.
- Mr Sunford Nyendwa, PPSC Chairman/ Farmer wanted informed the meeting that while he agrees that water quality issue is a serious issue he said that he has seen real improvements since 2002, and emissions have decreased greatly

to levels were they don't pose a threat to crops any more as farmers in the area are now able to grow various crops unlike in the past.

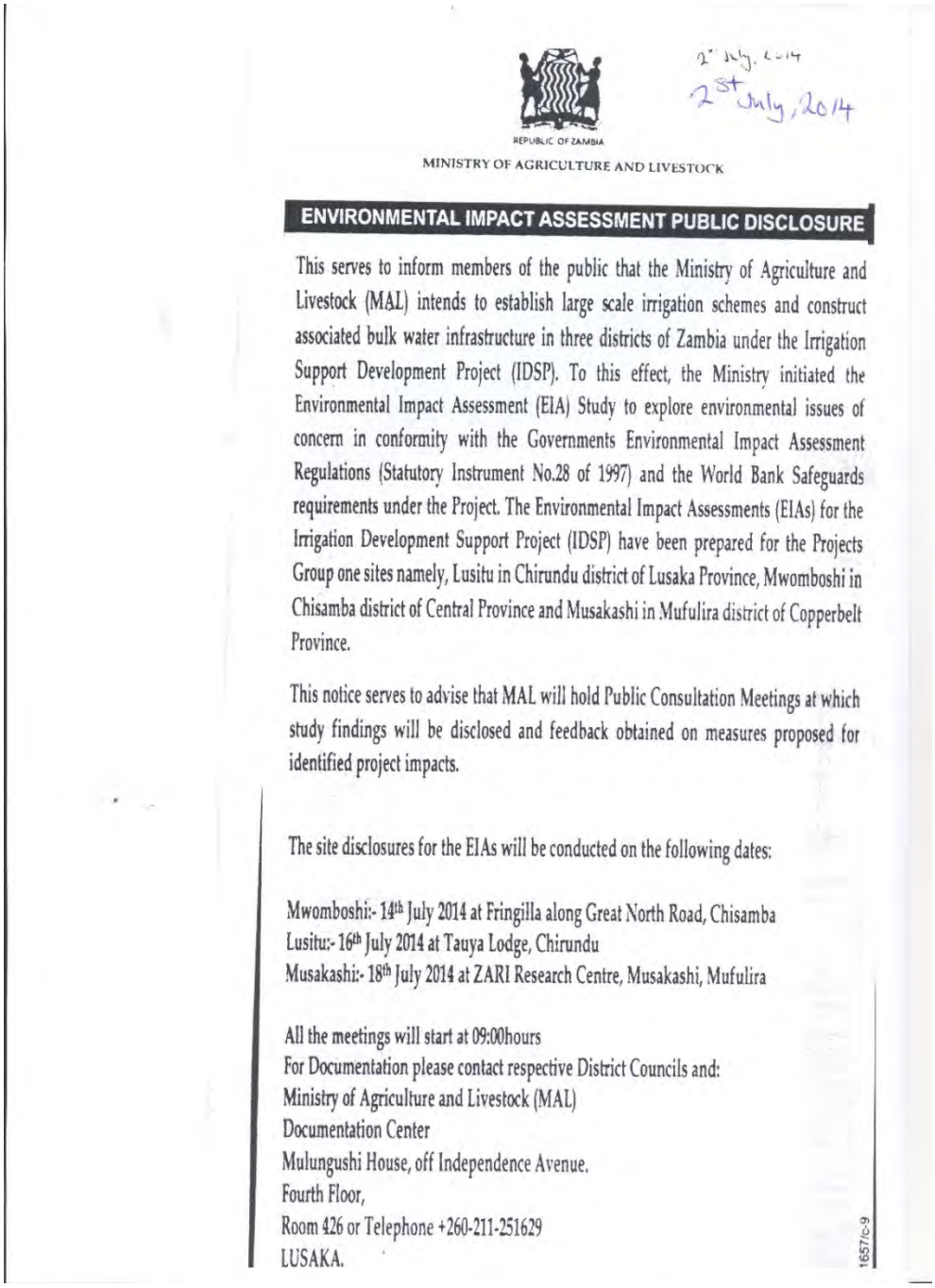
- Mr Raphael Banda, Lukoshi Clinical Officer/ community member wanted to know if the water from the Kafue River was fit for human consumption. In response, Mr Kenneth Nyundu, ESIA Team Leader informed Mr Nyendwa that river water can never be safe for direct consumption unless treated through boiling or chlorine application.
- Bishop John Chiluba, PPSC Member/ Farmer shared his experiences with similar projects in Swaziland. He said that the irrigation schemes with a similar concept were working very well and was positive that it will aslo work in Musakashi. He called upon the MAL to quicken up the process of initiation actual implementation of the project.
- Brian NKANDU, Zambia Environment Management Agency (ZEMA) Representative: The battle with the mines to decrease pollution has been engaged and now there are sanctions. Environmental Protection and pollution controlAct 1990 of the Laws of Zambia which is an Act to provide for the protection of the environment and the control of pollution exists and the mines must adhere to that and the mines need to submit reports on pollution level every 6 months. I also want to remind the IDSP team that ZEMA need the Resettlement Action Plan to check that the compensations proposed are sufficient.
- Mr. MAFULEKA, Seed control- ZARI wanted to know if there is a likelihood of pumping Kafue River dry due to the proposed irrigation scheme. In response, Mr Kenneth Nyundu, ESIA Team Leader said that the findings of the ESIA indicated that there in more than enough in the Kafue at minimum flow to sustain the proposed irrigation scheme without in any way affecting downstream users.
- Ms Raphael Banda, Lukoshi Clinical Officer/ community member wondered why the Map showing affeceted communities was not yet updated with observations made during the RAP disclosure meeting. In response, Ms Nathalie Jarno, Project Engineer, Sofreco said that although the map is not updated the data base has been updated and what remains is to print new maps.
- Mr Lazarous Sinyinza, Environmental Officer NFCA wanted to know how the ownership of the scheme would be. In response, Dr. Barnabas MULENGA, National IDSP Co-ordinator said that there will be three categories of farming systems: a private investor for Tier 3, out growers for Tier 2 and small-scale farmers for Tier 1 and will be based on the concept of a Public-Private partnership (PPP). The infrastructures will remain public goods and the community will own the scheme jointly with the private investors to ensure the scheme is run professionally.
- Way forward

The ESIA Team Leader, Kenneth NYUNDU, closed the plenary discussion by reaffirming that the ESIA team will revise the ESIA reports taking into account all the issues that stakeholders pointed out during the meeting. He said that the team was still open to further contributions from any stakeholder. In concluding, he highlighted the way forward concerning the ESIA process. He informed the meeting that deliberations of the meeting will be compiled and annexed in the main report for submission to MAL who will in turn submit to ZEMA the competent authority in environment for review and approval.

15.5 Closing remarks

The Permanent Secretary, Ministry of Agriculture and Livestock, Mr. J. SHAWA, concluded the meeting by thanking all participants for their active participation and valuable input. He assured the meeting that the Ministry will do everything possible to quicken the actual implementation of the project without compromising quality hence the need to have such meeting. He pointed out that infrastructure development was top on the agenda for Ministry and Musakashi Scheme was one such a scheme that the MAL want implemented.

15.6 Appendix



REPUBLIC OF ZAMBIA

2nd July, 2014

MINISTRY OF AGRICULTURE AND LIVESTOCK

ENVIRONMENTAL IMPACT ASSESSMENT PUBLIC DISCLOSURE

This serves to inform members of the public that the Ministry of Agriculture and Livestock (MAL) intends to establish large scale irrigation schemes and construct associated bulk water infrastructure in three districts of Zambia under the Irrigation Support Development Project (IDSP). To this effect, the Ministry initiated the Environmental Impact Assessment (EIA) Study to explore environmental issues of concern in conformity with the Governments Environmental Impact Assessment Regulations (Statutory Instrument No.28 of 1997) and the World Bank Safeguards requirements under the Project. The Environmental Impact Assessments (EIAs) for the Irrigation Development Support Project (IDSP) have been prepared for the Projects Group one sites namely, Lusitu in Chirundu district of Lusaka Province, Mwomboshi in Chisamba district of Central Province and Musakashi in Mufulira district of Copperbelt Province.

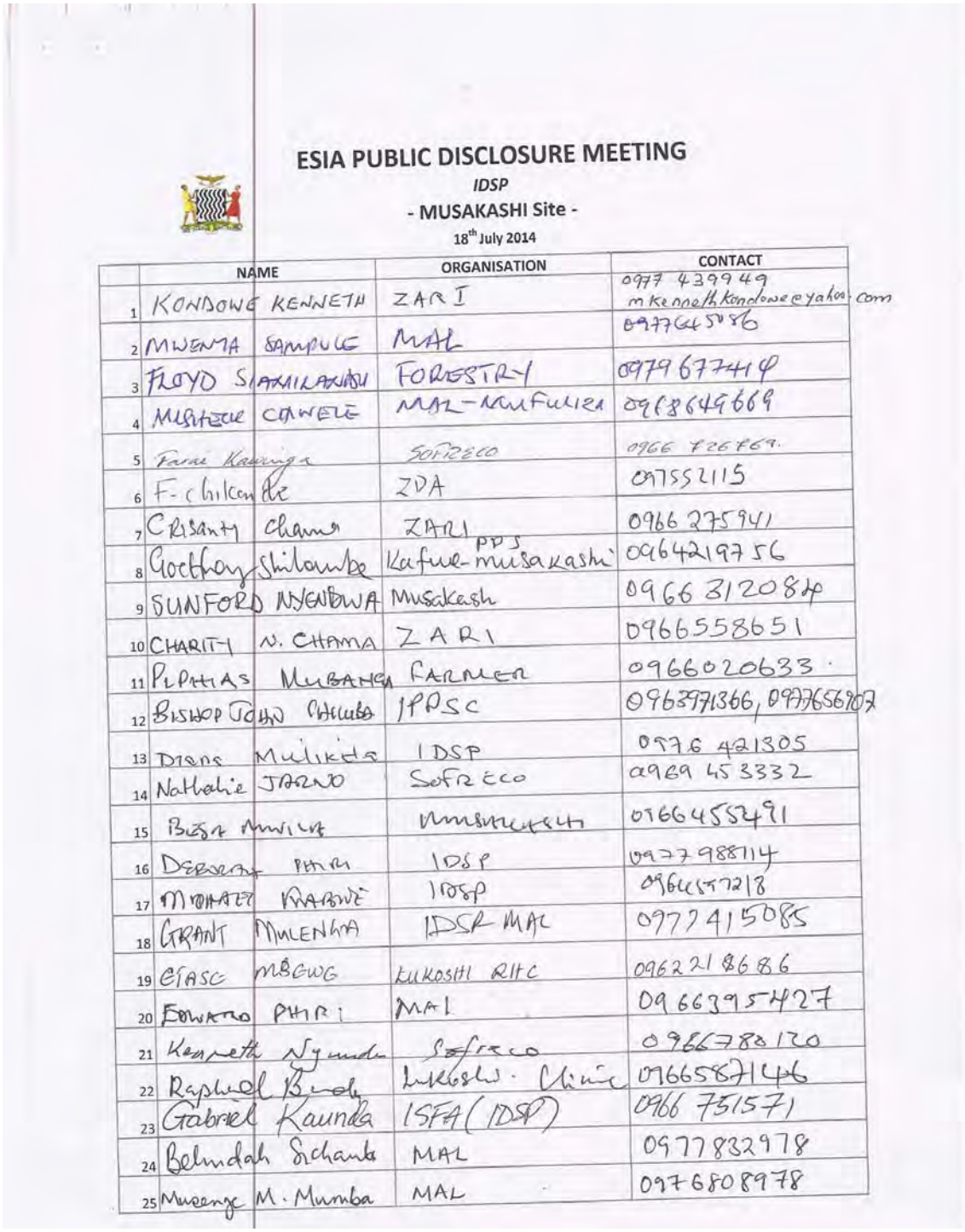
This notice serves to advise that MAL will hold Public Consultation Meetings at which study findings will be disclosed and feedback obtained on measures proposed for identified project impacts.

The site disclosures for the EIAs will be conducted on the following dates:

Mwomboshi:- 14th July 2014 at Fringilla along Great North Road, Chisamba
Lusitu:- 16th July 2014 at Tauya Lodge, Chirundu
Musakashi:- 18th July 2014 at ZARI Research Centre, Musakashi, Mufulira

All the meetings will start at 09:00hours
For Documentation please contact respective District Councils and:
Ministry of Agriculture and Livestock (MAL)
Documentation Center
Mulungushi House, off Independence Avenue.
Fourth Floor,
Room 426 or Telephone +260-211-251629
LUSAKA.

1657/c-9



ESIA PUBLIC DISCLOSURE MEETING

IDSP

- MUSAKASHI Site -

18th July 2014

	NAME	ORGANISATION	CONTACT
1	KONDOWE KENNETH	ZARI	0977 439949 mkennethkondowe@yahoo.com
2	MWENYA SAMPUCE	MAL	0977645086
3	FLOYD SIAKALAKWA	FORESTRY	0979677414
4	MUSITECHE CAMELE	MAL-KAUFULIRA	0968649669
5	Farai Kasinga	SOFRECO	0966 726769
6	F. Chilcombe	ZDA	097552115
7	CRISANTY Chama	ZARI	0966 275941
8	Geoffrey Shilomba	Kafue-PPS musakashi	0964219756
9	SUNFORD NYENBWA	Musakash	0966 312084
10	CHARITY N. CHAMA	ZARI	0966558651
11	PLPHIAS MUBANGA	FARMER	0966020633
12	BISHOP JOHN CHILUBA	IPRSC	0963971366, 0977656707
13	Diana Mulikita	IDSP	0976 421305
14	Nathalie JARNO	SofRECO	0969 453332
15	BEST MWILA	MUSAKASHI	0966455491
16	DEBORAH PHIRI	IDSP	0977988714
17	MOHATER KHABWE	IDSP	0966577218
18	GRANT MULENGA	IDSP MAL	0977415085
19	CIASC MBEWE	KUKOSHI RHC	0962186886
20	EDWARD PHIRI	MAL	0966395427
21	Kenneth Nyundo	Sofreco	0966780120
22	Raphael Banda	Lukoshi Clinic	0966587146
23	Gabriel Kaunda	ISFA (IDSP)	0966 751571
24	Belindah Sichanda	MAL	0977832978
25	Museny M. Mumba	MAL	0976808978

ESIA PUBLIC DISCLOSURE MEETING

IDSP

- MUSAKASHI Site -

18th July 2014

	NAME	ORGANISATION	CONTACT
26	MWASE PHIRI	ISFA (IDSP)	0977 780 745
27	C.K. Chileya	ISFA (IDSP)	0966 709110
28	K. MUSANYA	MAL	0965 79 37 11
29	K. MWALILU	COP	0961 938687
30	C.M.M. CHEWE	ISFA	0979578323
31	A. MULENGA	IDCP	0968-990116
32	G C DABALI	METEOROLOGY / FARMER	0977286330
33	GEORGE MUHANGA	PPSC	0971003202
34	JUSTIN KABWE	PPSC	0969 160979
35	MAFULEKAH	SEED CONTROL	0966-197687
36	JANET NTHANI	A/A MAFULIRA	0966658250
37	KUNDA MWANSA	PPSC	0969770190
38	Bernard chanda	PPSC	0961962074
39	GEORGE CHANDA	PPSS	0968560685
40	J. MACHAI	PPSC	0964911677
41	CHRISTOPHER MUSOLE	PPSC	096161055A
42	PETER H. HANZOWA	PPSC / MUSAKASHI	0966 36 34 66
43	Sonia Simumba	Sofreco	0977650889
44	Daniel Chamba	IDSP - MAL	0979 278 663
45	KAMBANI BANDA	NAIS	0978543365
46	Jilo A [illegible]	NFCA	0977 920468
47	LAZAROUS SINTINZA	NFCA	0977752427
48	MULAMBIA.H.Y	MUSAKASHI DAIRY	0977926804
49	Mukela L. Melvin	MMC	0964753510
50	Barbara Phiri	MMC	0965 501043

51. CHIPOMA B. MULENGA MMC 0969366441
52. NKandu Bwalya ZEMA-NKO 0967816535
53 THOMAS MULENGWE MAL 0966902160

ESIA PUBLIC DISCLOSURE METING
– MUSAKASHI SITE –
MUFULIRA
ZAMBIA RESEARCH INSTITUTE (ZARI)

18TH JULY 2014

TIME	ACTIVITY/ ITEM	Responsible
08.30 - 09.30	Registration	MAL -IDSP (D. Phiri)
09.30 - 09.45	Official Opening &Welcoming Address	Permanent Secretary.MAL (Mr. J. Shawa)
09.45 - 10.00	Introduction of Participants **(PS Site visit to Musakashi site)**	Facilitator/ Chairman. (B. Mulenga)
10.00 -11.00	Presentation of the ESIA	SOFRECO (K. Nyundu)
11.00 - 11.15	**Tea Break**	
11.15 - 12.30	Plenary Discussion	Participants
12.30 - 13.00	Way Forward	SOFRECO (K. Nyundu)
13.00 - 13.10	Closing Remarks	IDSP Project Coordinator
13.00 - 14.00	**LUNCH**	

ESIA Public Disclosure picture in Musakashi

16 ANNEX 16: ZEMA APPROVAL LETTER FOR ESIA TORS

ZEMA/INS/101/04/1

May 6, 2013

The Permanent Secretary
Ministry of Agriculture and Livestock
3RD Floor Mulungu House, Independence Road
P.O.BOX 50291
LUSAKA.

Dear Sir,

REF: TERMS OF REFERENCE FOR THE PROPOSED MUSAKASHI IRRIGATION SCHEME IN MUFULIRA DISTRICT.

Reference is made to the Terms of Reference (ToR's) for the proposed Musakashi irrigation scheme in Mufulira.

Kindly be advised that the review of the terms of reference indicates that the general objectives are acceptable. However, kindly synchronize the page numbers in the ToRs.

Once the page numbers have been synchronized, the Agency has **no objection** in you proceeding with the study.

Please do not hesitate to contact the undersigned should there be any issue during the study needing our attention.

Yours sincerely,

Julius P. Daka
A/Director General
ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY

17 ANNEX 17: SOIL EXPERT REPORT

Please refer to the attached file named:

Musakashi Detailed Soil Survey Final Report April2012.pdf

18 ANNEX 18: HYDROLOGY EXPERT REPORT

Please refer to the attached file named:

Musakashi Hydrology Report_Draft.pdf

19 ANNEX 19: SIGNED LIST OF AFFECTED PERSONS

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
	Thomas	Mukuba	m		213641/1611	Tubombeshe
	ZONE LEADER					
	PPSC CHAIR					
	SITE FACILITATOR					
12	Mary	Chikopela	F	65	12133/26/1	Kafue
13	Whyson	Ngambi	M	70	139422/47/1	Kafue
14	Agness	Mumba	F	41	228796/66/1	Kafue
16	Loveness	Mumba	F	46	209874/66/1	Kafue
25	Ester	Banda	F	46	0	Kafue
26	Espina	Mumba	F	45	197521/66/1	Kafue
27	Moses	Wamkukwamba	M	60	176336/82/1	Kafue
28	Milicah	Kashimbaya	F	48	169920/66/1	Kafue
29	Enos	Mugala	M	64	154635/66/1	Kafue
30	Elizabeth	Mapoma	F	65	265060/33/1	Kafue
31	yoramu	Siame	M	77	139422/47/1	Kafue
37	Mambwe	Muzinga	F	69	160560/66/1	Kafue
38	Osward	Bwalya	M	44	165363/45/1	Kafue
39	Kabungo	Prosper	M	63	123211/66/1	Kafue
59	Ivor	Chalansi	M	35	670093/11/1	Kafue
146	benard	chanda	m	60	195680/66/1	Kafue
147	ringson	chola	m	59	113134/12/1	Kafue
176	timothy	mulenga	m	78	132674/66/1	Kafue
177	geoffrey jnr	kapembwa	m	28	302125/66/1	Kafue
178	ray	banda	m	35	301673/66/1	Kafue
199	mandalena	musonda	f	50	202888/66/1	Kafue
200	liska	mumba	f	41	184621/16/1	Kafue
233	mathews	mwitaba	m	31		Kafue
234	muzenje	sakala	m	63	222442/61/1	Kafue
235	Alex		m			Kafue
236	George	Chinyimba	m	48	228709/66/1	Kafue
237	edward	mwelwa	m	74	10125366/1	Kafue
238	Amon	Katenda	m	57	125504/61/1	Kafue
239	chongo	kaulumba	m	65	189983/33/1	Kafue
240	Elnia	sakalia	f	65	133037/66/1	Kafue
289	Idah	Munganga	f			Kafue
290	Richard	Kachimbe	m	52	346327/65/1	Kafue
318	Morgan	kunda	m	50		Kafue
319	Burton	Katuta	m	62	116692/64/1	Kafue
320	Levy	mwila	m	60	146365/30/1	Kafue
321	James	Makumba	m	56	175294/68/1	Kafue
336	Thomas	Musanka	m	55	106925/76/1	Kafue
337	Rodah	Sakala	f	30	285207/66/1	Kafue
342	Prosper	Kabungo Jnr	m	38	111232/66/1	Kafue
343	Mary	Chibuta	f	58	182411/66/1	Kafue
350	Maggie	Kalyolyo	f	48	137869/65/1	Kafue
439	visto	mpundu	m	61	129405/33/1	kafue
440	Kennedy	chushi	m	33		kafue
441	Joseph	Machayi	m	50		kafue
442	john	ngambi	m	62		kafue

Chairperson - Sunfod Nyandwa

Vice Chairperson -

List of affected people - Musakashi						
Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
	JOSEPH	Mukuka			199967/67/1	Shangila
	Benjamin	Lambalinji				Shangila
	Timothy	Makina			126087/23/1	Shangila
	George	Simbowe			148141/65/1	Shangila
	Dorris	Munzenzi			147426/21/1	Shangila
	Joyce	Mwansa			192624/65/1	Shangila
	Sela	Nachalwe			139765/65/1	Shangila
	Harriet	Nanyangwe			898696/11/1	Shangila
	Janet	Mbimbi			124409/23/1	Shangila
	Ndengi	Lanisi			126434/23/1	Shangila
	Remmy	Mulundu			150448/33/1	Shangila
	Mwewa	Bwalya				Shangila
	STEPHEN	Chalwe			154768/65/1	Shangila
	Aaron	Mwale			175070/52/1	Shangila
	REUBEN	Mushi			130441/64/1	Shangila
	Misheck	Kaluba			202188/65/1	Shangila
	Yizzy	Phiri			189462/68/1	Shangila
	Robby	Mwansa				Shangila
	Newton	Ngosa				Shangila
	Musonda	Kaluba				Shangila
	RHODA	LUPIYA			152502/66/1	Shangila
	RUSIE	MWALIMU			176821/64/1	Shangila
	ZONE LEADER	SIKANYIKA W.				
	PPSC CHAIR	Sumford Nyendwa				
	SITE FACILITATOR					
	Kasaka	Oki	M	60	114744/65/1	Sikanyika
	Edward	Kayuma	M	42	285298/66/1	Sikanyika
2	Timothy	Markin	M	73	126087/23/1	Sikanyika
17	Wazwama	Poto	M	57	1210861/25/1	Sikanyika
21	godina	kasango	m	46	178358/32/1	Sikanyika
47	priscilla	wakumba	f	36	261426/66/1	Sikanyika
109	bisa	siwila	f	44	177675/47/1	Sikanyika
124	munshya	bella	f	64	151839/66/1	Sikanyika
158	ngandwe	davies	m	34	169188/63/1	Sikanyika
159	mwewa	joan	f	58	198560/67/1	Sikanyika
252	kachansa	mary	f	32	204917/65/1	Sikanyika
254	Jane	Muzala	f	36	223971/67/1	Sikanyika
256	lason	safeli	m	40	248150/66/1	Sikanyika
286	Shadreck	semegi	m	63	122593/23/1	Sikanyika
287	Wilson	Mwape	m	63	184953/33/1	Sikanyika
288	harry	nyimbili	m	78	114260/47/1	Sikanyika
298	joseph	musonda	m	60	169349/66/1	Sikanyika
310	Movister	Mambwe	m	29	296641/66/1	Sikanyika
311	musonda	rosemary	f	54	175046/68/1	Sikanyika
330	alan	soza	m	54	121476/22/1	Sikanyika
332	Sikanyika	wayison	m	70	100933/47/1	Sikanyika
333	ledison	Kachasa	m	75	116015/63/1	Sikanyika
345	Charity	Mwansa	f	39	272030/64/1	Sikanyika
346	faides	mwanza	f	32		Sikanyika

SIKANYIKA W.

Chairperson. Sumford Nyendwa

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
391	Frazer	Zulu	m	49	220066/66/1	Luanshimba
392	Nakauala	Majory	f	47		Luanshimba
393	Rogers	Kapembwa	m	40	305791/67/1	Luanshimba
394	Kana	Hildah barnbas	f	69	141425/64/1	Luanshimba
395	Mumba	Christine	f	52	199072/66/1	Luanshimba
396	N'gombe probably N	Judith	f	54	129843/65/1	Luanshimba
397	musonda	Dorothy Muleng	f	50	165273/44/1	Luanshimba
398	Mwansa	Elvis m	m	50		Luanshimba
	ZONE LEADER					
	PPSC CHAIR					
	SITE FACILITATOR					
1	Rosemary	Chipa	F	49	197920/32/1	Nsofu
48	Matini	Mulenga	M	65	122167/66/1	Nsofu
58	Muyunda	Muyunda	M	41	0	Nsofu
60	Muyunda	Kaongolo	M	40	0	Nsofu
61	Munga	Masiye	M	41	437399/52/1	Nsofu
68	donald	sungula	m	50	156395/62/1	Nsofu
75	anderson	mutinta	m	49	143301/15/1	Nsofu
76	lazarous godfrey	ingwe dabali	m	39	110419/55/1	Nsofu
78	divine	hakayobo	f	32		Nsofu
79	adrian	mubanga	m	75	111097/63/1	Nsofu
80	chibanda	joseph	m	62	132737/44/1	Nsofu
81	jackson	chela	m	78	106731/65/1	Nsofu
173	agness	namubiza	f	50	203815/67/1	Nsofu
186	derry	chisenga	m	69	112483/65/1	Nsofu
520	victor	chama	m	48		nsofu
521	Isaac	mafuleka	m	43	384626/52/1	nsofu
522	frederick	chipa	m			nsofu
523	Joseph	nthani	m	52		nsofu
524	micheal	munga	m	32		nsofu
525	fridah	chileshe	f	54	126329/63/1	nsofu
526	martin	mulenga Junior	m	45		nsofu
527	chrisante	chama	m	49		nsofu
528	philip	Banda	m	48		nsofu
529	jack	Kabwe	m	22		nsofu
530	precious	mulundano	f	45		nsofu
531	Edward	Chishimba	m	58		nsofu
77	sefelino	nsokolo	m	55	237427/67/1	Tubombeshe
94	marian	sobongo	f	35	211647/32/1	Phiri
167	enock	musamba	m	45	207510/66/1	Phiri
229	plachini	silwamba	m	31	336080/66/1	Phiri
291	Special	Phiri	m	68	199531/11/1	Phiri
294	Simon J	Sikoki	m	92	164881/86/1	Phiri
295	Postani	Phiri	m	69	231586/67/1	Phiri
296	Joseph	Wakamba	m	50	285293/66/1	Phiri
297	Emmanuel	Yavwa	m	60	131559/63/1	Phiri
299	ester	Miti	f	38	141852/65/1	Phiri
300	Muley Joel	Sianyinda	m	65	185460/73/1	Phiri
301	Steven	Yavwa	m	59	131939/63/1	Phiri

List of affected people - Musakashi						
Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
362	sini	kamwasha	f	53	117270/23/1	Sikanyika
455	Peter	Ndau	m	58	904403/67/1	Sikanyika
456	eness	malunga	f	60	107754/44/1	Sikanyika
457	Charles	chivinda	m	53	106766/22/1	Sikanyika
458	Angela	Nakanika	f	54	285193/66/1	Sikanyika
459	dyson	kafunda	m	56	179279/66/1	Sikanyika
460	hellen	mayumbelo	f	35	358487/67/1	Sikanyika
461	roger	samakai	m	42	142150/65/1	Sikanyika
464	jane	muzala	f	65	223971/67/1	Sikanyika
465	Elias	makaba	m	72		Sikanyika
466	oliver	kyapatwa	m	44	238006/66/1	Sikanyika
467	colinus	nachembe	f	51	194170/66/1	Sikanyika
468	Everlyn Matapo	chunga	f	64	110233/62/1	Sikanyika
469	tickness	mkandawire	f	57	285932/66/1	Sikanyika
470	magrate	sesa	f	50	125713/66/1	Sikanyika
471	grace	namwiinga	f	38	210717/65/1	Sikanyika
472	paul .E	mulula	m	52	119082/66/1	Sikanyika
473	Felix	nkole	m	42		Sikanyika
	ZONE LEADER					
	PPSC CHAIR					
	SITE FACILITATOR					
	joseph	mukuka	m	65	199967/67/1	Silungwe
	peter	Silungwe	m	66	147196/47/1	Silungwe
187	dina	chanzi	f	68	145603/51/1	Silungwe
216	joseph	ndumba	m	78	114770/67/1	Silungwe
217	frank	chinyama	m	42	349784/65/1	Silungwe
218	nasel	chimba	m	76		Silungwe
219	boston	chanzi	m	77	204776/51/1	Silungwe
220	James	Munyika	m	30	226079/42/1	Silungwe
221	Jesters	Musonda	m	72	154371/66/1	Silungwe
292	mbwambo	yava	f	40	163502/63/1	Silungwe
293	james	mulenga	m	60	204319/33/1	Silungwe
491	jimson	siyanda	m	50		Silungwe
492	Maggie	nkatya	f	48		Silungwe
493	cecilia bwalya	chungu	f	50		Silungwe
494	midah	Munyika	f	43		Silungwe
495	silive	sazeka	m	54		Silungwe
496	fidless	nampungwe	f	64		Silungwe
497	dinala	namwai	m	56		Silungwe
498	nyirenda	Golden	m	38	261560/51/1	Silungwe
499	kalaluka	ireen	f	55	122621/24/1	Silungwe
500	Augustine	chimba	m	34		Silungwe
501	grace	nalwimba	f	43	127362/65/1	Silungwe
502	Eunice	Nakanyika	f	28	285222/66/1	Silungwe
	ZONE LEADER					
	PPSC CHAIR					
	SITE FACILITATOR					
503	Lydia	Hikeembe	F	37	0	Tubombeshe
280	Foster	Ndeke	M	42	0	Tubombeshe

Sonia Simumba

Chairperson - Sunford Nyandiga

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
34	mary	mbewe	f	35	114068/55/1	Tubombeshe
62	annie	ngulibe	f	34	127415/55/1	Tubombeshe
63	makadani	nthani	m	38	120204/55/1	Tubombeshe
64	janet	nthani	f	40	421256/52/1	Tubombeshe
65	only	sinkende	m	27	288882/73/1	Tubombeshe
66	peter	hanzooma	m	38	110770/18/1	Tubombeshe
67	longwe	capion	m	92	121270/74/1	Tubombeshe
92	dorica	mwanza	f	43	224554/52/1	Tubombeshe
121	evans	musonda	m	40	235495/66/1	Tubombeshe
122	laila	musanje	f	64	120339/73/1	Tubombeshe
223	Charles	Mafusafwa	m	40		Tubombeshe
224	Thomas	Mukubwe	m	42	213641//6/1	Tubombeshe
415	Happy	Simukoko	m	43		Tubombeshe
416	Edward	Phiri	m	43		Tubombeshe
417	George	Yande	m	26		Tubombeshe
418	maxmillian	mayumbelo	m	62	119188/63/1	Tubombeshe
419	Ruth	Chiti	f	36		Tubombeshe
477						

ZONE LEADER
PPSC CHAIR
SITE FACILITATOR

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
123	mwakongo	ndofu	m	55	122782/65/1	Shangila
152	rabbeca	ndengi	f	55	143550/23/1	Shangila
153	mwanauta	venas	f	68	192824/65/1	Shangila
154	muyutu	samuyombo	m	78	deceased?	Shangila
155	jonevera	mbuyi	f	59	122314/65/1	Shangila
156	Timothy	Musonda	m	62	205910/67/1	Shangila
157	saphilinya	kutemba	f	63	170354/66/1	Shangila
162	fred	mwila	m	47	145327/65/1	Shangila
182	joyce	mubanga	f	57	124565/41/1	Shangila
183	morgan	chisenga	m	56	137253/65/1	Shangila
185	harrison	chipwila	m	38	171089/22/1	Shangila
188	alfred	bwalya	m	60	126283/65/1	Shangila
189	nyangwa	mwabu	f	36	163503/63/1	Shangila
190	womba	sebente	f	53	150215/23/1	Shangila
191	francis	Sikanyika	m	39	232420/64/1	Shangila
194	sombo	kangombe	f	41	136379/63/1	Shangila
195	alfred	makanga	m	57	111515/62/1	Shangila
196	monica	cinjenge	f	47	203278/66/1	Shangila
197	mwansa	makungo	m	28	226971/62/1	Shangila
198	mwansa	macdonald	m	67	301735/11/1	Shangila
257	lambalinji	benjamin	m	44	139400/65/1	Shangila
258	mwenya	robinson	m	26	311519/64/1	Shangila
259	simukoko	john	m	67	109068/63/1	Shangila
260	chibwe	mathias	m	36	202270/32/1	Shangila
261	Evaristo	Bwalya	m	66	150641/66/1	Shangila
262	Costina	Namwayi	f	54	154371/47/1	Shangila
264	Olipa	Namfukwe	f	63	141132/47/1	Shangila
265	Pascal	Bwalya	m	54	182930/64/1	Shangila
266	Shadreck	Bendula	m	40	183811/65/1	Shangila
267	Lawrence	Lyanonga	m	49	242408/67/1	Shangila
268	Masansa	Grace	f	48	161479/41/1	Shangila
269	Namushi	Kakonga	m	56	149627/64/1	Shangila
270	Robert	Makayi	m	51	234713/67/1	Shangila
271	rosemary double wi	Chilambwe	f	55	189637/66/1	Shangila
272	Hildah	Chilando	f	48	153932/43/1	Shangila
273	Mishecck	Kaluba	m	31	202188/65/1	Shangila
277	john	simukoko	m	69	109068/63/1	shangila
278	chijenge	charles	m	52	131434/22/1	shangila
446	Prisca	Mumba	f	49		shangila
447	Pamela	nakamba	f	40		shangila
448	ernest	Chitende	m	52	177598/64/1	shangila
449	christine	chipanta	f	62		shangila
450	mwate hummphery	Kabwe	m	51		shangila
451	grace	mansa	f	48		shangila
452	enock	maseka	m	67		shangila
453	LAWRENCE	Mwansa				Shangila
454	Precious	Kapalu	f		171089/22/1	Shangila
	Noah	Sikanyika				Shangila
	Fredrick	Mumba			114161/65/1	Shangila

Sonia Simumba
Sofreco Site facilitator

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
15	Agness	Mumba	F			Kafue
32	Freda	Chileshe	F	54	126329/63/1	Kabanana
33	Elida	Miti	F			Nsofu
44	Ann	Onn	F			
49	Mwamba	Regina	F		179632/43/1	Nsofu
70	Cinjenge	Charles	m	47	131434/22/1	Shangila
84	Mwelwa	Emmelia	f	60	1219515/43/1	
85	Davies	Mundandwe	m	23	354488/65/1	
86	mundandwe	george	m	39	210727/65/1	
101	moses	chishimba	m	31	244589/33/1	
107	jackson	kabulogo	m	68	112503/68/1	
139	mailes	namonje	f	63	270315/67/1	
255	kabulayi	chiwafwa	m	85	119306/24/1	
279	Enest	Chiteta	m	53	177589/64/1	
263	Aliphonso	Dorothy	f	52	148153/23/1	Chimbamilonga
87	edwina	musonda	f	67	138342/61/1	Chimbamilonga
137	fredrick	kawanga	m	70	120294/66/1	Chimbamilonga
230	Tisiye	Hara	f	81	123133/67/1	Chimbamilonga
231	mwangala	timothy	m	71	107517/84/1	Chimbamilonga
232	belita	musoni	f	53	196025/66/1	Chimbamilonga
246	simwanza	Sunday	m	60	113541/13/1	Chimbamilonga
306	Elison	Ngambi	m	65	103566/68/1	Chimbamilonga
307	English	Zulu	m	77	165347/52/1	Chimbamilonga
324	Mubuyaeta	Nalishebo	f	50	178800/83/1	Chimbamilonga
325	Chau	Chala	m	76	130030/63/1	Chimbamilonga
326	Kaona	Dorothy	f	55	158002/47/1	Chimbamilonga
327	Namuyemba	Agness	f	23	313589/66/1	Chimbamilonga
328	Sichula	joel	m	21	346084/65/1	Chimbamilonga
329	Kaloki	james	m	56	22025/67/1	Chimbamilonga
348	Luka	Musonda	m	80	147121/41/1	Chimbamilonga
349	Kachinka	Elizabeth	f	69	120777/17/1	Chimbamilonga
351	Mwesa	Constatine	m	63	105649/31/1	Chimbamilonga
352	Lisesa	Idah	f	53	132194/63/1	Chimbamilonga
355	Mulenga	Inkson	m	70	146724/11/1	Chimbamilonga
356	Mwila	Elizabeth	f	49	383168/11/1	Chimbamilonga
420	Augustine	Kanchinka	m	22		Chimbamilonga
421	Kuyanda	John	m	68		Chimbamilonga
422	Peter	Mukuka	M	62	122427/42/1	Chimbamilonga
423	Benson	Botha	m	73	162169/68/1	Chimbamilonga
	James	Kanyambi	M		130854/66/1	Chimbamilonga
	Dohana	Soneka			148387/65/1	Chimbamilonga
	Beauty	Matipa			160959/62/1	Chimbamilonga
	MULENGA	Mafoko			162708/65/1	Chimbamilonga
	Enock	Kamusaki			146380/22/1	Chimbamilonga
	Julien	MUSONDA			162728/44/1	Chimbamilonga
	Eskel	Chinkana			135651/61/1	Chimbamilonga
	Josephine	Ngonga			140891/21/1	Chimbamilonga
	Gilbert	Mbumba			123210/66/1	Chimbamilonga
	Grace	Kanyanga			283451/66/1	Chimbamilonga

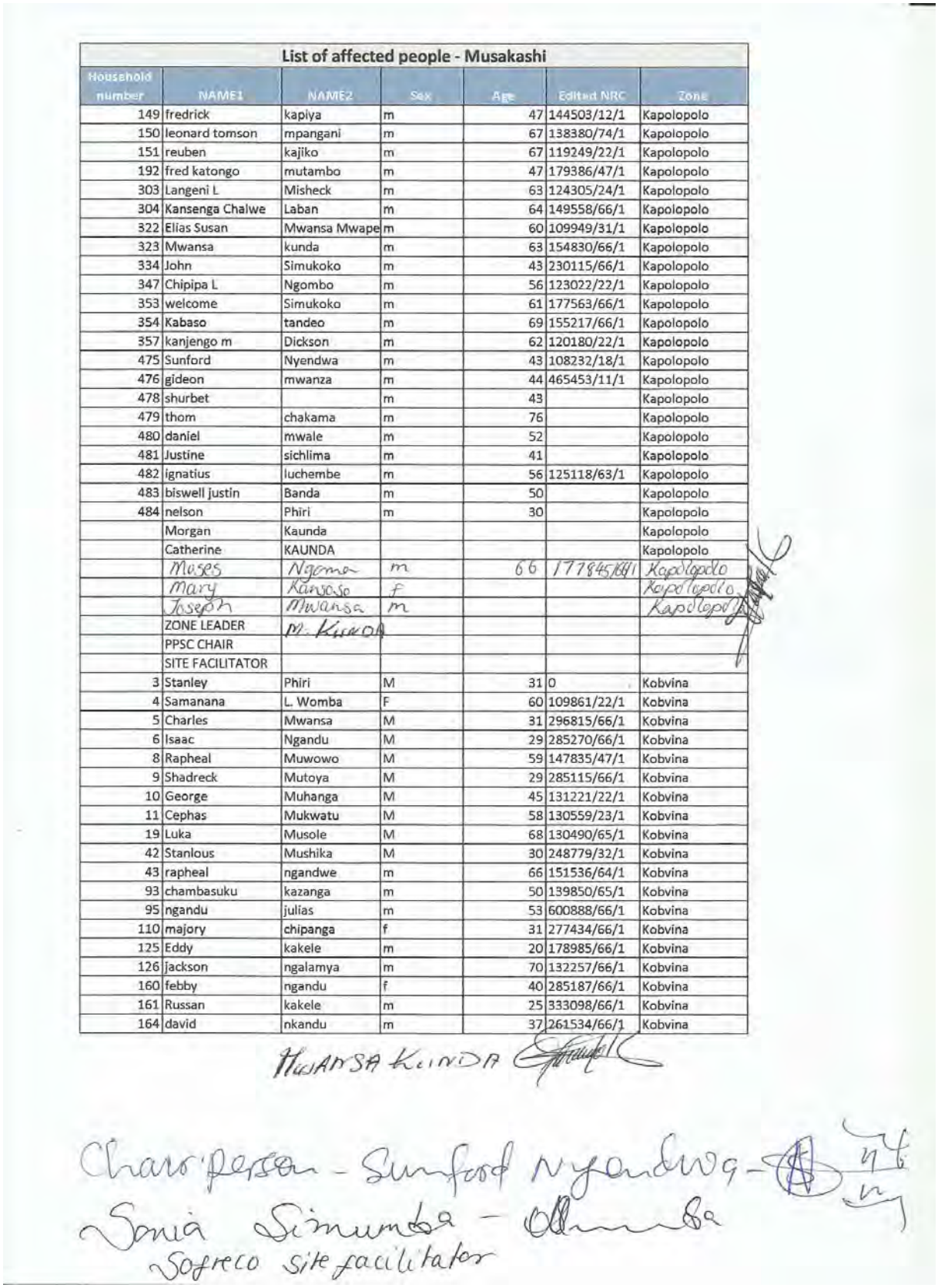
Chairperson – Sunford Nyandwa

Sofreco Site facilitator –

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
166	alick	mwale	M	61	169461/66/1	Kobvina
168	john	nkonde	m	52	185898/56/1	Kobvina
171	thomas	chisweka	m	53	139609/66/1	Kobvina
193	Moffat	sikambale	m	32		Kobvina
222	lewis	kayokolo	m	48	445337/11/1	Kobvina
225	muhanga	benard	m	28		Kobvina
226	chanda	edward	m	76	129500/64/1	Kobvina
227	ngandu	isaac	m	17	285270/66/1	Kobvina
228	keleby	sikambale	m	72	145753/66/1	Kobvina
247	wellington	mwansa	m	62	119645/63/1	Kobvina
248	sharot	musole	f	58	130237/63/1	Kobvina
251	agatha	musonda	f	55	122829/65/1	Kobvina
281	Felix	Mwenya	m	56	204356/66/1	Kobvina
282	Alex	Mpotoyi	m	25	223322/65/1	Kobvina
283	Rodah	kayombo	f	63	114156/66/1	Kobvina
284	Justin	Mfula	m	50	208974/66/1	Kobvina
285	Yoram	Mulambia	m	56	126230/46/1	Kobvina
400	Edward	Chabasanga	m	58	119624/65/1	kobvina
401	Fewdays	Chanka	m	61	136089/65/1	kobvina
402	Lottie	Chinyanta	m	48	450630/11/1	kobvina
403	Rapheal	Muwowo	m	59	147835/47/1	kobvina
404	Rose	Upite	f	46	140156/65/1	kobvina
405	Charles	Mhanga	m	78	153212/66/1	kobvina
406	Rapheal	Ngandwe	m	67	151536/64/1	kobvina
407	Lewis m	Kayokolo	m	48	445337/11/1	kobvina
408	Stanley	Phiri	m	31		kobvina
409	Betty	Sweta	f	38	137448/22/1	kobvina
410	Cephas	Mukwatu	m	58	130559/23/1	kobvina
411	Julias	Ngandu	m	64	160888/66/1	kobvina
412	Jackson	Ngalamya	m	70	132257/66/1	kobvina
413	Kazanga	Chambasuku	m	50	139850/65/1	kobvina
414	Alex	Pontoyi	m	19	223322/65/1	kobvina
485	Mecia	Chikunjiko	f	58	178985/22/1	kobvina
486	mary	ngandu	f	45	193623/66/1	kobvina
487	Grace	Kakele	f	20	226736/66/1	kobvina
488	Felix	Nakaundu	m	37	262059/82/1	kobvina
489	Dalimo	Pontoyi	f	20	223320/65/1	kobvina
490	Leny	chanda	m	51	118210/64/1	kobvina
504	Racheal	nakamba	f	41	227907/47/1	kobvina
505	daiman	chipango, see als	m	78		kobvina
506	febby	Bwalya	f	39	285187/66/1	kobvina
507	john	chavula	m	53	194059/66/1	kobvina
508	Alass C	Kasanda	m	56	268361/33/1	kobvina
509	james	bupe	m		135242/66/1	kobvina
510	Christopher	kalumba	m	47	181170/33/1	kobvina
	ZONE LEADER	GEORGE MUHANGA			181221/22/1	
	PPSC CHAIR					
	SITE FACILITATOR					
82	mumba	easter	f	44	148086/65/1	Luanshimba

GEORGE MUHANGA
Sonia Simumba



List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
149	fredrick	kapiya	m	47	144503/12/1	Kapolopolo
150	leonard tomson	mpangani	m	67	138380/74/1	Kapolopolo
151	reuben	kajiko	m	67	119249/22/1	Kapolopolo
192	fred katongo	mutambo	m	47	179386/47/1	Kapolopolo
303	Langeni L	Misheck	m	63	124305/24/1	Kapolopolo
304	Kansenga Chalwe	Laban	m	64	149558/66/1	Kapolopolo
322	Elias Susan	Mwansa Mwape	m	60	109949/31/1	Kapolopolo
323	Mwansa	kunda	m	63	154830/66/1	Kapolopolo
334	John	Simukoko	m	43	230115/66/1	Kapolopolo
347	Chipipa L	Ngombo	m	56	123022/22/1	Kapolopolo
353	welcome	Simukoko	m	61	177563/66/1	Kapolopolo
354	Kabaso	tandeo	m	69	155217/66/1	Kapolopolo
357	kanjengo m	Dickson	m	62	120180/22/1	Kapolopolo
475	Sunford	Nyendwa	m	43	108232/18/1	Kapolopolo
476	gideon	mwanza	m	44	465453/11/1	Kapolopolo
478	shurbet		m	43		Kapolopolo
479	thom	chakama	m	76		Kapolopolo
480	daniel	mwale	m	52		Kapolopolo
481	Justine	sichlima	m	41		Kapolopolo
482	ignatius	luchembe	m	56	125118/63/1	Kapolopolo
483	biswell justin	Banda	m	50		Kapolopolo
484	nelson	Phiri	m	30		Kapolopolo
	Morgan	Kaunda				Kapolopolo
	Catherine	KAUNDA				Kapolopolo
	Moses	Ngoma	m	66	177845/61/1	Kapolopolo
	Mary	Kansoso	f			Kapolopolo
	Joseph	Mwansa	m			Kapolopolo
	ZONE LEADER	M. KUNDA				
	PPSC CHAIR					
	SITE FACILITATOR					
3	Stanley	Phiri	M	31	0	Kobvina
4	Samanana	L. Womba	F	60	109861/22/1	Kobvina
5	Charles	Mwansa	M	31	296815/66/1	Kobvina
6	Isaac	Ngandu	M	29	285270/66/1	Kobvina
8	Rapheal	Muwowo	M	59	147835/47/1	Kobvina
9	Shadreck	Mutoya	M	29	285115/66/1	Kobvina
10	George	Muhanga	M	45	131221/22/1	Kobvina
11	Cephas	Mukwatu	M	58	130559/23/1	Kobvina
19	Luka	Musole	M	68	130490/65/1	Kobvina
42	Stanlous	Mushika	M	30	248779/32/1	Kobvina
43	rapheal	ngandwe	m	66	151536/64/1	Kobvina
93	chambasuku	kazanga	m	50	139850/65/1	Kobvina
95	ngandu	julias	m	53	600888/66/1	Kobvina
110	majory	chipanga	f	31	277434/66/1	Kobvina
125	Eddy	kakele	m	20	178985/66/1	Kobvina
126	jackson	ngalamya	m	70	132257/66/1	Kobvina
160	febby	ngandu	f	40	285187/66/1	Kobvina
161	Russan	kakele	m	25	333098/66/1	Kobvina
164	david	nkandu	m	37	261534/66/1	Kobvina

MWANSA KUNDA

Chairperson - Sunford Nyendwa

Sonia Simunda - Sofreco site facilitator

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
83	samson	banda	m	50	168377/41/1	Luanshimba
96	p shimishi	robert	m		107269/21/1	Luanshimba
97	musanda	gladys	f	31	202790/65/1	Luanshimba
98	susiku	mundandwe	m	69	138852/66/1	Luanshimba
100	tresford	chibwe	m	43	259162/33/1	Luanshimba
102	tetus	mwape	m	60	203985/33/1	Luanshimba
103	moses	mupaka	m	36	243350/64/1	Luanshimba
113	sustone	sichone	m	77	128572/27/1	Luanshimba
114	victoria	katanjiko	f	64	152679/64/1	Luanshimba
115	mubanga	evaness	f	54	182710/66/1	Luanshimba
116	chibuye	cathrine	f	55	216693/67/1	Luanshimba
117	beaterice	banda	f	51	250498/67/1	Luanshimba
118	jinana	mulambu	m	49	134630/25/1	Luanshimba
119	davis	kahilu	m	43	234773/67/1	Luanshimba
120	peter	ngulube	m	65	305086/11/1	Luanshimba
127	jennipher	mwelwa	f	42	181584/31/1	Luanshimba
128	cosmas	chisanga	m	83	109870/43/1	Luanshimba
129	joseph	kamiji	m	66	182069/66/1	Luanshimba
130	sebastian	mutale	m	69	173979/61/1	Luanshimba
131	christine	kalelesi	f	40	148514/66/1	Luanshimba
138	saston	sichone	m	78	125427/47/1	Luanshimba
140	funwell	kusaloka	m	57	139219/23/1	Luanshimba
141	cathrine	musonda	f	533	188829/66/1	Luanshimba
174	benson	kabwe	m	57	168961/64/1	Luanshimba
175	florence	mweni	f	50	163932/32/1	Luanshimba
179	anna	kaminyau	f	57	166631/64/1	Luanshimba
180	chipulo	alubina	f	49	147118/31/1	Luanshimba
181	justina	bwalya	f	42	237836/66/1	Luanshimba
201	aaron	kamboyi	m	71	115731/231	Luanshimba
202	james	nseba	m	60	160723/66/1	Luanshimba
203	john	chikonde	m	82	169737/61/1	Luanshimba
204	henry	kamanga	m	68	119369/17/1	Luanshimba
205	wilson	tandiloko	m	60	113656/13/1	Luanshimba
206	chunga	mwansa	m	69		Luanshimba
207	costa	sinunu	m	49	138907/65/1	Luanshimba
208	malembo	simulilo	m	57	125277/85/1	Luanshimba
209	william	chenga	m	46	198926/43/1	Luanshimba
210	edward	makalu	m	75	134881/22/1	Luanshimba
211	alex hildah	kapinga kaumba	m	56	132906/23/1	Luanshimba
212	stephen	chama	m	74	125886/71/1	Luanshimba
213	kachepa	nancy	f	72	119267/65/1	Luanshimba
214	syvester	mulumbwa	m	66	165596/66/1	Luanshimba
215	weddington	nkosi	m	71	164359/43/1	Luanshimba
253	nkole	felix	m	43	221989/66/1	Luanshimba
359	Moses	Lumayi	m	37	156768/63/1	Luanshimba
368	John	Chiluba	m	60		Luanshimba
22	Mundandule	Golden	M	38	211840/62/1	Luanshimba
23	Muyembe	Fordson	M	66	125132/23/1	Luanshimba
24	Chanda	Simon	M	32	203706/44/1	Luanshimba

Chairperson - Sumford Nyandwe
Sofreco Site Facilitator – Lubumba

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
360	Mathew	Mulenga	m	66	210806/67/1	Phiri
361	Justine	Kabwe	m	54	215507/33/1	Phiri
511	mario	antonio	f	72	158063/23/1	Phiri
512	thresa	mwewe	f	62	107204/64/1	Phiri
513	laston	chipulo	m	59	162317/64/1	Phiri
514	ruth	yavwa	f	37	210706/63/1	Phiri
515	Martha	kulelwa	f	55	167887/32/1	Phiri
516	victor	chalwe	m	41	238056/32/1	Phiri
517	molton	Muwowo	m	56	166819/16/1	Phiri
518	Getrude Dinah	nyangu	f	49	271086/11/1	Phiri
519	Jester	N musonda	f	30	154371/66/1	Phiri
	Thresa	Mwewa	f	47	107204/64/1	Phiri
	Patrick	Simwanza	m	72	142639/47/1	Phiri
	Charles	MAMBWE	m	48	192746/66/1	Phiri
	Chabu	Jackline	f	45	156575/65/1	Phiri
	Musonda	Jesters	m	73	154371/66/1	Phiri
	Chibuye	Sunday	m	38	180792/65/1	Phiri
	Martha	Kulela	f	55	167887/32/1	Phiri
	Mary	Muwowo	f	68	166819/16/1	Phiri
	christina	petrol	f	40	188921/64/1	Phiri
	George	sekwila	m	32	279307/66/1	Phiri
	mika	lufuka	f	48	124720/68/1	Phiri
	oscar	ngandwe	m	26	292918/64/1	Phiri
	Regina	mwamba	f	52	179632/43/1	Phiri
	sancious	changwe	m	30	234862/67/1	Phiri
	Francis	chama	m	71	229213/67/1	Phiri
	Mathews	mulenga	m	66	210806/61/1	Phiri
	musa	nyirenda	m	51	167898/66/1	Phiri
	Dainess	mwila	f	40	154275/65/1	Phiri
	Jonas	mubanga	m	52	148762/32/1	Phiri
	Roy	goddard	m	33	218836/42/1	Phiri
	Dorince	Munzenzi	f	49	147426/21/1	Phiri
	ZONE LEADER	PHIRI	ZONE			
	PPSC CHAIR					
	SITE FACILITATOR					
	mary	Musonda	f	59	227123/67/1	Shangila
	dason	siame	m	65	137588/47/1	Shangila
165	osward	komani	m	50	178705/32/1	Shangila
169	hilda	nakamba	f	56	131986/66/1	Shangila
170	Musala	K	M	90	159247/67/1	Shangila
172	Christopher	Musole	M	43	153598/65/1	Shangila
18	emmy	nalwamba	f	60	144439/47/1	Shangila
20	victor	chama	m	41	139622/44/1	Shangila
69	kasongo	john	m	70	159493/66/1	Shangila
71	prisca	venase	f	36	400960/67/1	Shangila
72	chisambaula	morris	m	67	115357/23/1	Shangila
99	dinaless	namukonda	f	58	142042/47/1	Shangila
111	noah	Sikanyika	m	70	104387/47/1	Shangila
112	george	muhunga	m	80		Shangila

KABWE

JUSTIN KABWE
Sofreco Site facilitator –

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
	Francis	Musonda			144754/43/1	Chimbamilonga
	Mashikini	Elias			150320/23/1	Chimbamilonga
	Mulenga	Zulu			137959/65/1	Chimbamilonga
	Bupe	Kambobe			279115/61/1	Chimbamilonga
	ZONE LEADER					
	PPSC CHAIR					
	FACILITATOR					
	Katuka	Mwanza			140194/23/1	Chimbamilonga
399	Musole	Sharot	f	58		k
35	Franics	Sikanyika	M	43	0	Kabanana
36	Vera	Namukonda	F	60	169212/66/1	Kabanana
57	Khabango	Nthani	M	38	2876471/52/1	Kabanana
163	justine	kunda	m	38	183859/65/1	Kabanana
184	lister	simukanga	f	69	119227/64/1	Kabanana
241	mubanga	andrew	m	49	140104/65/1	Kabanana
242	banda	raphael	m	51	369772/11/1	Kabanana
243	nanyirongo	olita	f	54	162201/64/1	Kabanana
244	phiri	florence	f	54	140355/12/1	Kabanana
245	nambaya	loveness	f	60	131773/47/1	Kabanana
249	estone	simbeye	m	74	138927/47/1	Kabanana
250	namukwasa	violet	f	60	126812/47/1	Kabanana
305	Chongo	job	m	65	173603/33/1	Kabanana
309	febby	Namubizza	f	68	124184/68/1	Kabanana
312	sandoki	Munyenyemba	m	35	2117101/62/1	Kabanana
317	Borniface	Kasesa	m	51	160018/62/1	Kabanana
335	David	Mwansa	m	49	288230/66/1	Kabanana
338	makulata	Teresa M	f	64	106724/63/1	Kabanana
339	Seliva	Simuwelu	f	55	126028/47/1	Kabanana
340	Chinombwe	Eunice	f	35	135362/33/1	Kabanana
344	Veronica	Belyani	f	67	100325/66/1	Kabanana
358	Mwape	Pande E	f	60	158485/64/1	Kabanana
424	Judith	Nambeya	f			Kabanana
425	Francis	Muteba	m		189766/61/1	Kabanana
426	Mwamba	florence	f	26	346143/65/1	Kabanana
427	Kenny	Simwelu	m	51	138657/65/1	Kabanana
428	Besa	Mwila	m	41	156238/63/1	Kabanana
429	finess	Nakabala	f	57	141961/47/1	Kabanana
430	Sunday	Kanyika	m	28	285314/66/1	Kabanana
431	khabago	nthani	m			Kabanana
432	Susan	khondowe	f	41	638913/11/1	Kabanana
433	Siwale	Musiyani	m	47	213154/16/1	Kabanana
434	fanwell	sichilima	m	81	120749/42/1	Kabanana
436	mathias	Phiri	m			Kabanana
437	vincent	mubanga	m	40		Kabanana
438	Jane	Chintu	f	45		Kabanana
	Nambeya	Christine	f		132428/47/1	Kabanana
	Simukanga	Davies	M		163983/65/1	Kabanana
	Chanda	Webby	m		180479/17/1	Kabanana
	Ester	Namukwasa	f		288230/66/1	Kabanana

Chairperson - Sunford Nyendwe

ZONE LEADER - BESA MWILA - Besa

Sofreco Site facilitator -

List of affected people - Musakashi

Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
40	Royd	Tembo	M	55	133053/65/1	Luanshimba
41	Chinyama	Kambulo	M	37	0	Luanshimba
45	Chola	Chishimba	F	20	340000/66/1	Luanshimba
46	Mfula	Magret	F	70	179292/66/1	Luanshimba
50	Nelson Elvis	Mwansa	M	75	110854/64/1	Luanshimba
51	Banda	Matta	M	62	263572/52/1	Luanshimba
52	Oscar	Ngandwe	M	25	292918/64/1	Luanshimba
53	Mbulo	Davis	M	62	143600/66/1	Luanshimba
54	Benard	Kasonso	M	48	188644/62/1	Luanshimba
55	Eness	Chinama	F	58	180903/66/1	Luanshimba
56	Benard	Musole	M	61	126574/65/1	Luanshimba
274	doreen	munsanda	f	65	139606/23/11	Luanshimba
275	Mumba	Vestone	m	71	1246170/51/1	Luanshimba
276	Muzinga	Bernadette	f	80	140487/99/1	Luanshimba
302	David	Mwinilunga	m	56	228650/67/1	Luanshimba
308	nseba	Kabaso	f	61	201589/33/1	Luanshimba
313	Golden	Kahudi	m	67	108422/24/1	Luanshimba
314	Mary	Namfukwe	f	50	2111471/66/1	Luanshimba
315	Chinyama	Lingeni	m	57	221352/67/1	Luanshimba
316	Ndola	Muyanabo	f	50	143189/85/1	Luanshimba
331	Makai	jackson	m	64	111137/23/1	Luanshimba
341	Shakilina	Mupinga	f	54	142326/62/1	Luanshimba
363	Hildah	Kaumba	f	42		Luanshimba
364	Sunday	Ndau	m	28		Luanshimba
365	Emelia	Mwelwa	f	59		Luanshimba
366	Chanda loveness	mwansa	f	60		Luanshimba
367	Belia	Mulundu	f	56		Luanshimba
369	Boias	simukonda	m	38		Luanshimba
370	Bwale	Grace	f	60		Luanshimba
371	Kaoma Enock	Musonda	m	62		Luanshimba
372	Clement	Musonda	m	47		Luanshimba
373	Shamputa	Joyce	f	55		Luanshimba
374	Chinyama	Dickson	m	57	247651/67/1	Luanshimba
375	Manex	Kashimba	m	29		Luanshimba
376	Jane	muzanga	f	46	188644/62/1	Luanshimba
377	Chalilusa	Edson	m	24		Luanshimba
378	Kaoma	Saiwelo	m	63		Luanshimba
379	Rosemary double w	Chilambwe	f	53		Luanshimba
380	Ezekiel	Banda	m	56		Luanshimba
381	Ndabika	Lukanga	m	62		Luanshimba
382	riness	Samukasa	f	51	158699/23/1	Luanshimba
383	Dorothy	Aliphonso	f	53	148153/23/1	Luanshimba
384	Billingsley	Siyangwe	m	62		Luanshimba
385	Mulenga	Mary	f	65		Luanshimba
386	Malan	Kashimbi	m	50		Luanshimba
387	Kambeu	Silvia	f	22	354454/65/1	Luanshimba
388	Davies	Chiyengi	m	64	191354/67/1	Luanshimba
389	Molisa	Mugepuka	f	70		Luanshimba
390	Bwalya	Mary	f	34	210718/65/1	Luanshimba

Sofreco Site facilitator –

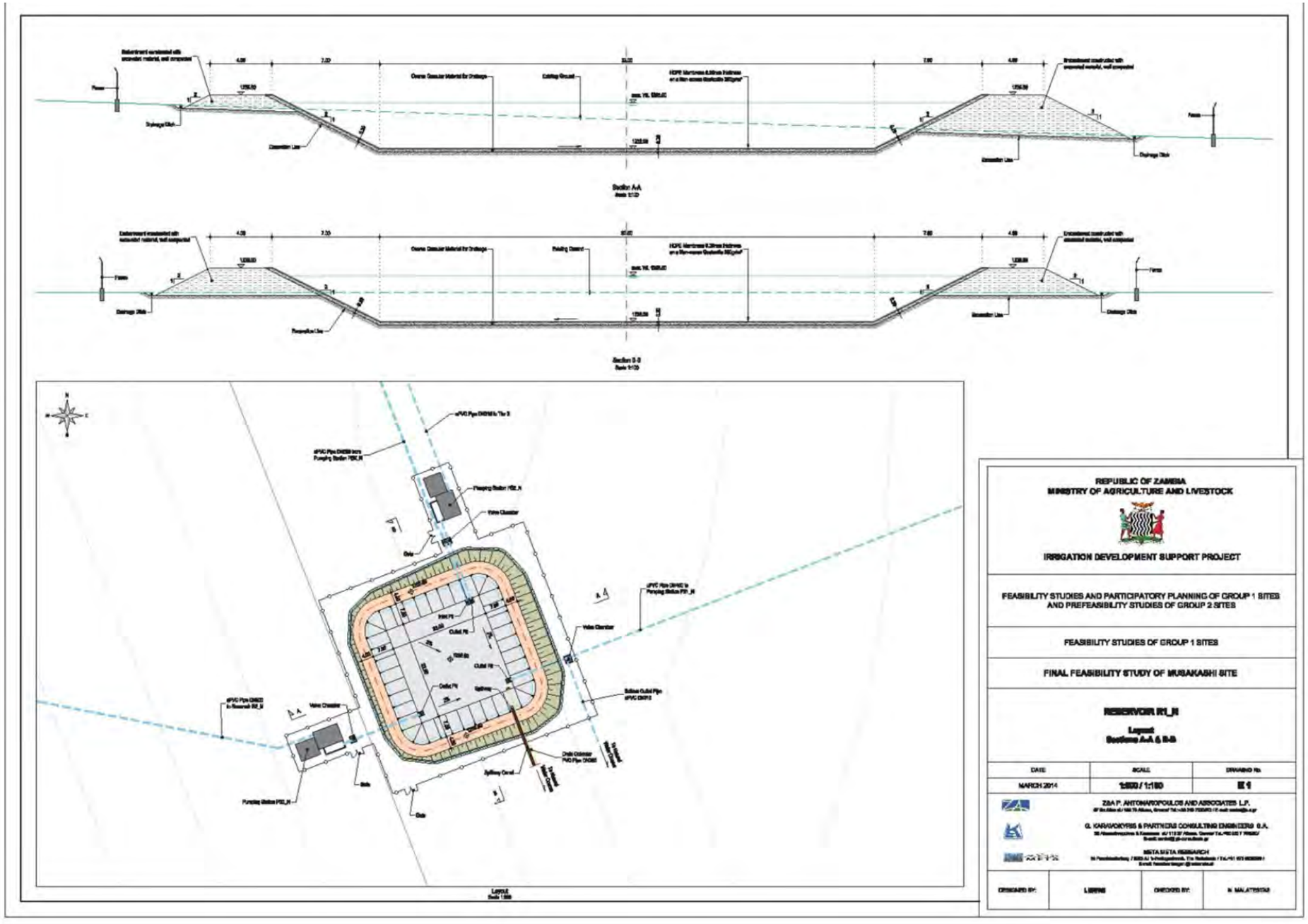
Chairperson – Sunford Nyendwa

List of affected people - Musakashi

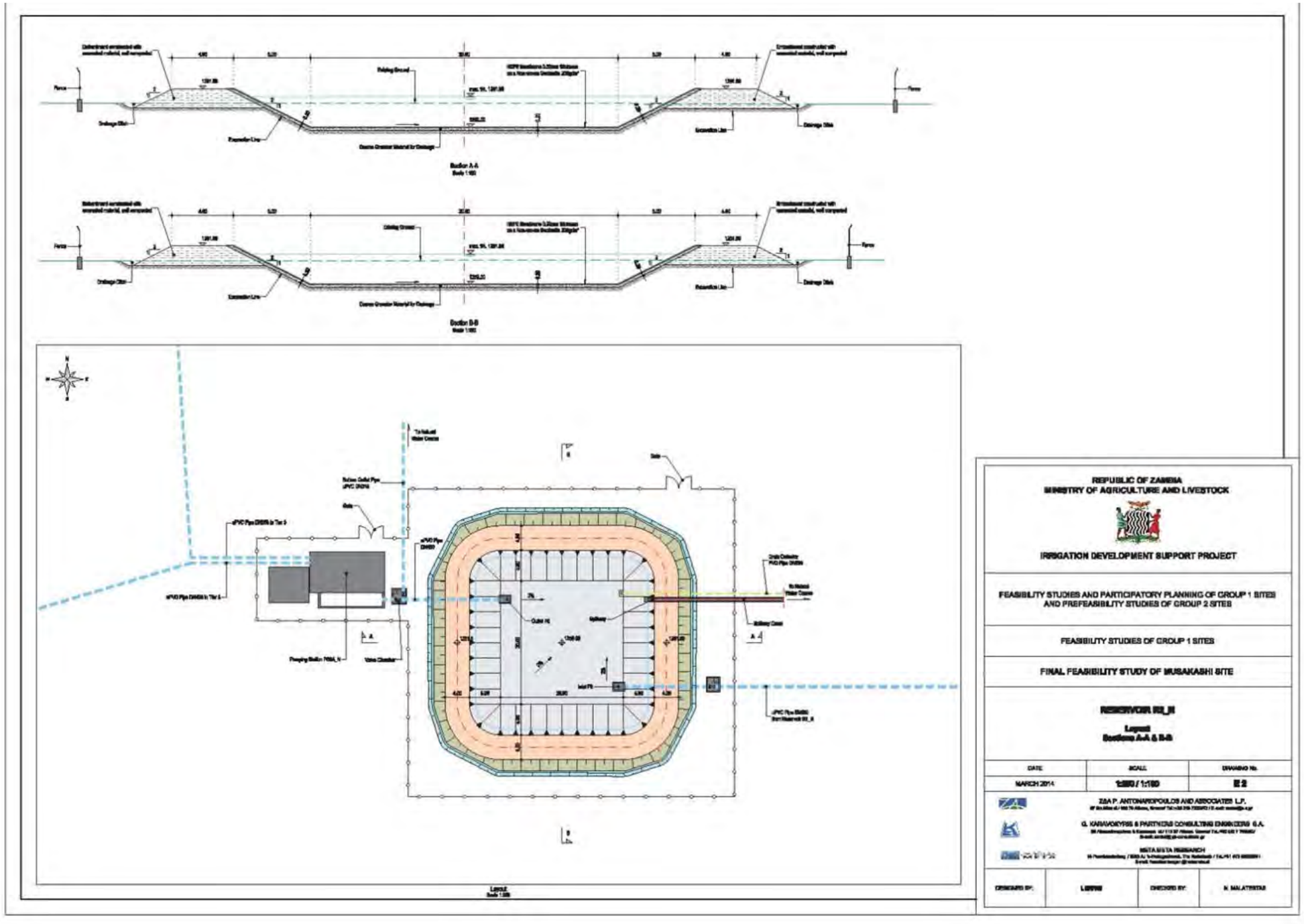
Household number	NAME1	NAME2	Sex	Age	Edited NRC	Zone
443	Agness	Mumba	f	32	210704/65/1	kafue
444	Godfrey	shilombe	m	51	193870/66/1	kafue
445	anna	chiteta	f	38	283380/66/1	kafue
462	ivor	chalansi	m	33	670093/11/1	kafue
463	Bornface	Kabwe	m			kafue
474	Jennipher	kumuchele	f	52	167402/66/1	kafue
	Kashoto	Mpundu				Kafue
	Mwansa	Musonda				Kafue
	Eris	Mbambala				Kafue
	Vincent	Kalumba				Kafue
	Dickson	Wamukwamba	M		308396/66/1	Kafue
	Royda	Musonda	F		181580/66/1	Kafue
	Georgina	Mkandawire	F		182058/66/1	Kafue
	Collins	Shilombe	M		281649/66/1	Kafue
	Stanslous	Kaoma	M		101004/44/1	Kafue
	James	Chola	M		220135/66/1	Kafue
	Jonny	Bweupe	M		246675/66/1	Kafue
	Chrispin	Simpamba	M		183739/65/1	Kafue
	Beauty	Mumba	F		258877/33/1	Kafue
	Magaret	Nakombe	F		197204/66/1	Kafue
	Derrick	Mwansa	M		287252/66/1	Kafue
	Benjamin	Chipwila	M		129804/65/1	Kafue
	Broker	Mulenga	M		288529/65/1	Kafue
	Matilda	Mwila	F		109939/66/1	Kafue
	ROSEMARY	Bwalya	F		108750/63/1	Kafue
	Albetina	Chola	f		123979/66/1	Kafue
	ZONE LEADER	[illegible]				
	PPSC CHAIR					
	SITE FACILITATOR					
73	paul	kaunda	m	61	123783/66/1	Kapolopolo
74	andrew	mumba	m	67	119731/66/1	Kapolopolo
88	innocent	Mutale	m	31	205869/65/1	Kapolopolo
89	mulenga	mwitaba	m	50	18060/66/1	Kapolopolo
90	luka	simfukwe	m	50	197775/66/1	Kapolopolo
91	angulina	mkandawire	f	66	115706/43/1	Kapolopolo
104	rika	chilesha	f	70	203124/66/1	Kapolopolo
105	Nsofu	grace	f	37	266531/66/1	Kapolopolo
106	ngoma	moses	m	65	177852/66/1	Kapolopolo
108	leonard stephen	munkondya sika	m	45	282722/67/1	Kapolopolo
132	patrick	kayiko	m	45	224683/66/1	Kapolopolo
133	samuel	Manchishi	m	33	102110/19/1	Kapolopolo
134	peter	kanungulu	m	69	152935/66/1	Kapolopolo
135	paul	kaunda	m	61	223045/65/1	Kapolopolo
136	cosmus	mayonde	m	63	153394/66/1	Kapolopolo
142	james	simukonda	m	27	249042/47/1	Kapolopolo
143	laston	singogo	m	26		Kapolopolo
144	john	kaoma	m	31	234285/47/1	Kapolopolo
145	estelle	gibson	f	63	112760/66/1	Kapolopolo
148	thomson	mpangani	m	29	283857/66/1	Kapolopolo

Chairperson - Sunford Nyandwa
Vice Chairperson -

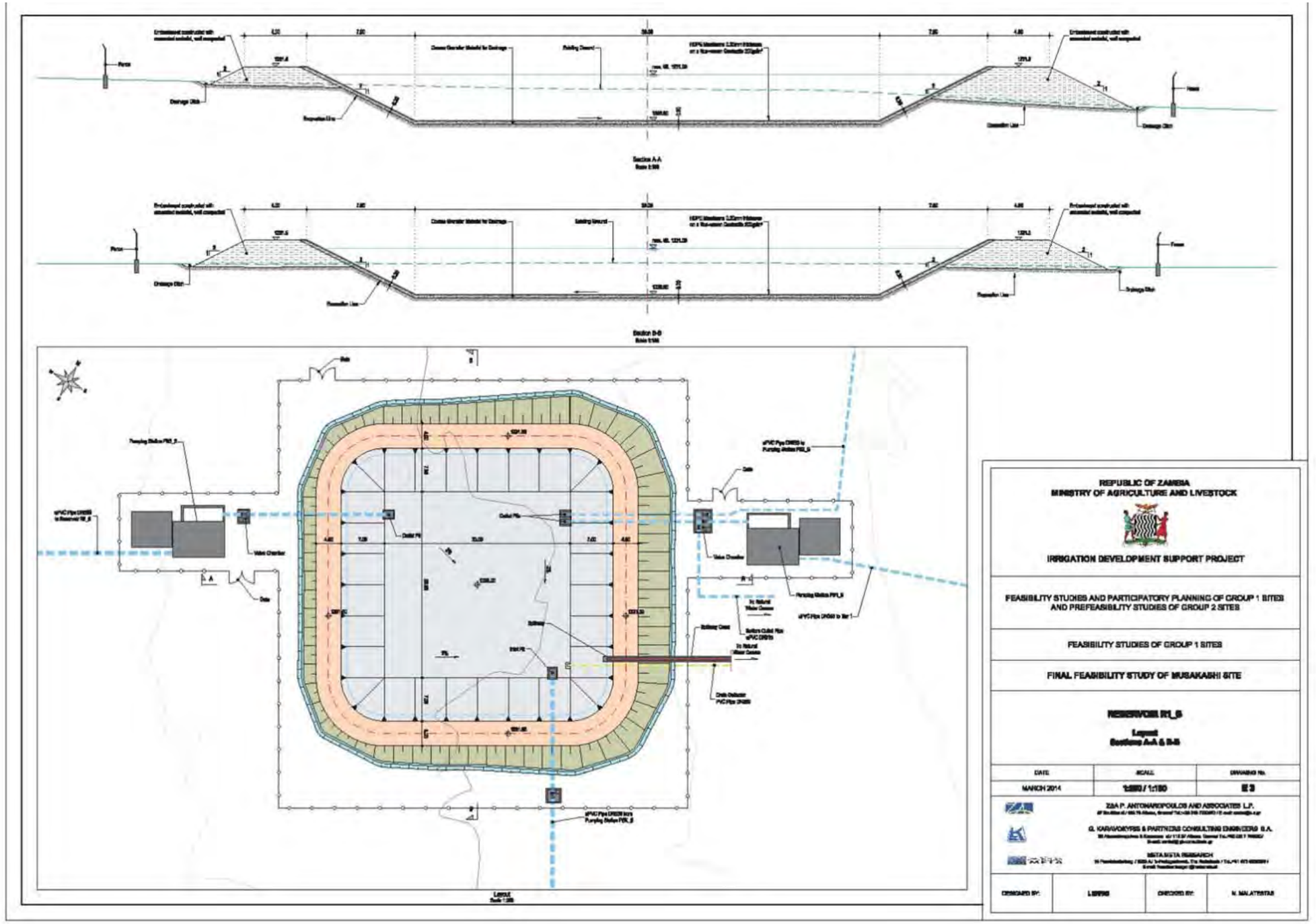
20 ANNEX 20: RESERVOIR DESIGN DRAWINGS



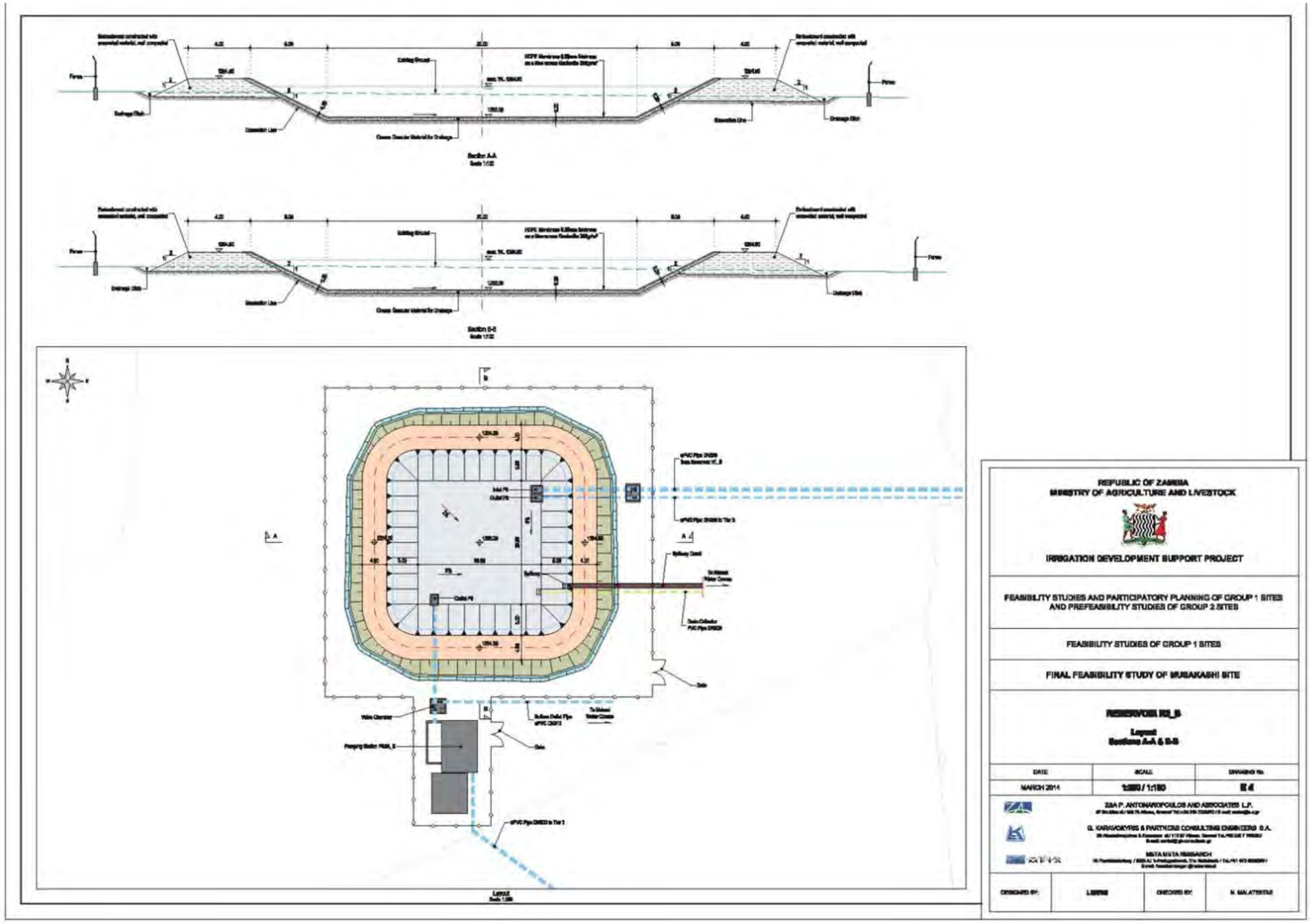
Drawing 1: Reservoir R1 North



Drawing 2: Reservoir R2 North



Drawing 3: Reservoir R1 South



Drawing 4: Reservoir R2 South

21 ANNEX 21: LETTER OF CLEARANCE FROM ZEMA

ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY

Head Office
Corner of Church & Suez Roads
P.O. Box 35131
Lusaka, Zambia
Tel: +260- 211-254130/254023/254059
Fax:+260-211-254164/256658

Northern Regional Office
Jacaranda Road
P.O. Box 71302
Ndola, Zambia
Tel: +260-212-621048/610407
Fax: +260-212-610246

Livingstone Office
Plot No. 555
Junction Obote / Neru Roads
Livingstone, Zambia
Tel / Fax:+260-213-321297

Chirundu Border Office
Lusaka Road
P.O. Box CRU31
Chirundu, Zambia
Tel/Fax: +260-211-515261

In reply please quote

No: ZEMA/FAC/102/12/9/M/53

August 20, 2015

The National Project Coordinator
Ministry of Agriculture and Livestock
Irrigation Development Support Project
P.O. Box 50291
LUSAKA

Dear Sir,

Ref: Environmental Impact Statement (EIS) and Resettlement Action Plan (RAP) for the Proposed Musakashi Irrigation Scheme in Mufulira

The above matter refers.

The Zambia Environmental Management Agency (ZEMA) has reviewed the said EIS and RAP and would now like to inform The Ministry of Agriculture to pay for the documents and submit twelve final hard copies of the EIS, twelve final hard copies of the RAP and soft copies of both documents.

The Agency would like to request The Ministry of Agriculture to delete the word "draft" from the title of the documents to be submitted.

Find attached an invoice for the EIS and RAP review fee amounting to Kwacha Six Forty Nine Thousand Nine Hundred Ninety Five (***K649, 995.00***) only.

Yours faithfully,

Webby Simwayi
A/Manager-Northern Region
For/Director General
ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY

22 ANNEX 22: ESIA FINAL REPORT – ANNEXES-MUSAKASHI

REPUBLIC OF ZAMBIA

Republic of Zambia

World Bank

Ministry of Agriculture and Livestock

Addendum to the
Environmental and Social Impact Assessment
Final Report
VOLUME II

for the Proposed

Irrigation Scheme in Musakashi in Mufulira District

Submitted to World Bank

December 2016

SOFRECO

PROJECT BRIEF NOTES

Proponent:

Ministry of Agriculture and Livestock (MAL), Zambia Ministry Of Agriculture and Livestock (Mal) Mulungushi House, Independence Rd, 3rd Floor, Box 50291 Lusaka.

Developer's Contact Person:

Ms Mono Kanjeresa, Safeguard Specialist, +260-211-251629, +260-211-252029

Project Location:

Chisamba District, Central Province, Zambia

Project Summary:

The central concept of IDSP involve re-allocation of land and water resources for irrigated agriculture under a partnership arrangement between the Government, private operators and communities. Under this project different types of farms (i.e. Tier 1 to 3) are envisaged;

Tier 1 will be for smallholder farmers who wish to take up irrigated agriculture using mainly family labour, with individually farmed plots of 1 ha or less, using surface irrigation to grow vegetables and other high value crops;

Tier 2 will consist of larger plots of between one and five hectares each, for cultivation by emerging small-scale commercial farmers or small groups of neighbouring farmers, using sprinkler irrigation systems and hired labour to profitably grow mainly field crops;

Tier 3 will consist of large plots of at least 60 ha each under centre-pivot irrigation operated by a private company that will eventually be wholly owned by the community but initially will be jointly owned with a private sector investor; and

Estimated Capital investment and Project Commencement Date:

Approximate project cost is US$78.1 million. Project commencement date is 2014

ESIA Study Consultant:

SOFRECO (Societé Française de Réalisation, d'Etudes et de Conseil)

EXECUTIVE SUMMARY

This addendum has been prepared to provide supplementary information to the Environmental and Social Impact Assessment (ESIA) final report that was submitted to the Environmental Management Agency (ZEMA) and World Bank in 2015 in order to clarify and update certain aspects contained in the ESIA final report regarding the proposed Musakashi Irrigation Scheme project. Therefore, this report should not be read in isolation but with cross reference to the main Musakashi Irrigation Scheme ESIA final report.

Further, it should be noted that the scope/objective and project area of influence remains unchanged. And the implementer remains Ministry of Agriculture (MAL) and Livestock under the project 'Irrigation Development Support Project (IDSP)' while the operationalization of the proposed project will be facilitated by government through MAL. Oownership of the project at operation will be shared among the local communities, as well as government.

The project site is located in Mufulira District on the Copperbelt Province encompassing the right bank of Kafue River. Refer to figure 1-2 for the location map. The Musakashi project site will constitute three land divisions known as tiers. The project site is located on the right-bank of the Kafue River, in Mufulira District, between latitude 12°32' and 12°35' south and between longitude 28°06' and 28°09' east, and at an elevation of 1,220 to 1,260masl..

This addendum give additional information regarding three main aspects namely;

Clearly defining the study area and its sub components

Updating maps with associated narrations to ensure clarity in terms of approach to ESIA study in relation to social and environmental receptors

Updating the Environmental Management Plan in terms of re-assigning responsibilities and re-costing.

By providing this supplementary information, it is the conviction of the ESIA study team that social economic and environmental impacts arising from the proposed project will be better understood in context without leaving any grey area. And that minimum requirements are met in addressing World Bank Safe guard policies triggered by this project.

SIGN:……
Dr Barnabas MULENGA
Designation: Project Co-ordinator, IDSP
Ministry of Agriculture and Livestock
Tel:+260 211 251 629

Table of Contents

1. Project Area

1.1 Location and Layout

The Musakashi project site will constitute three land divisions known as tiers. The project site is located on the right-bank of the Kafue River, in Mufulira District, between latitude 12°32' and 12°35' south and between longitude 28°06' and 28°09' east, and at an elevation of 1,220 to 1,260masl. The proposed irrigation areas are split between North and South zones, taking advantage of the suitable soils. The site is accessible from the Kitwe-Mufulira road, and is about 35km NW of Kitwe. See Figure 1-1: Sketch Map of the Location of Musakashi Group 1 Site.

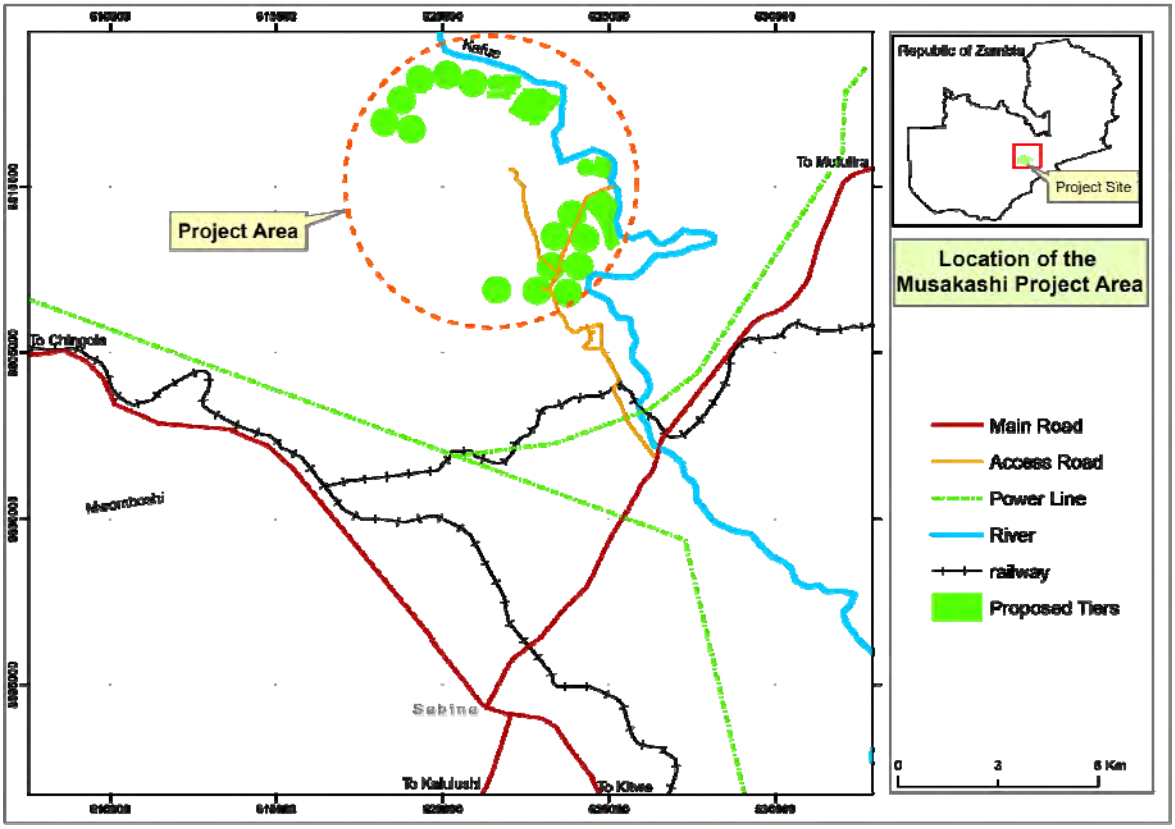


Figure 1-1: Map showing Project Location Map

1.2 Spatial Extent of the Study Area

The spatial extent of the study area was Kafue River sub-catchment including Musakashi and surrounding areas in Mufulira district in Copperbelt province The spatial extent of the study area that was assessed included existing settlements, irrigation areas (planned). Other linked planned activities such as resettlement areas, roads and transmission lines fall within the area that was assessed and no significant impacts are envisaged at all.. Note that the assessment was also extended to immediate surrounding areas outside immediate project area of influence approximately 5km radius in extent. See the figure 1-2 below showing the study area

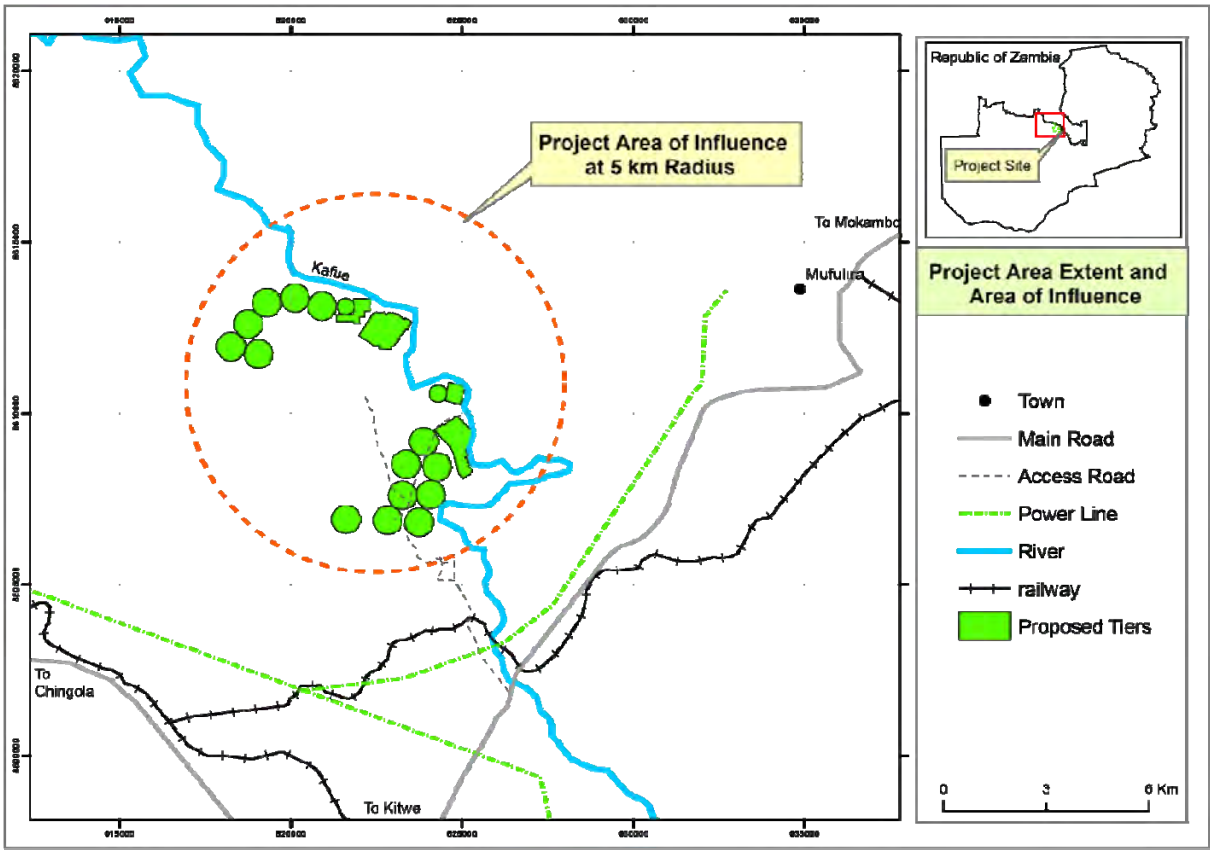


Figure 1-2: Map showing project area of Influence

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2. Study Approach and Baseline Information

2.1 Study Approach

2.1.1 Scoping Studies

The Scoping exercise aimed at identifying potential environmental (socio-economic and biophysical) impacts, contemplate environmentally considerate options for the design detail, and identify issues of concern for Interested and Affected Parties (IAPs) and stakeholders. The scoping exercise included review of the project literature, targeted consultations with the relevant authorities and stakeholders and open meetings.

Stakeholder consulted included local communities civic leaders. The environmental scoping process provided an opportunity for stakeholders to get clear, accurate and understandable information about the expected environmental issues or impacts of the proposed project; voice their concerns and to raise questions regarding the project; suggest ways for reducing or mitigating any negative impacts and for enhancing its positive impacts. At the same time it provided an opportunity for MAL to incorporate the needs, preferences and values of IAPs into their planning and design decisions. This process is vital for ensuring transparency and accountability in decision-making and creating sense of ownership among the community.

2.1.2 Approach

The approach to the scoping exercise was done step-wise starting with a reconnaissance survey for appreciating the project area, followed by initial meetings with public officials and local leadership in the project area and general consultative public meetings and lastly followed by detailed expert studies. The study area assessed was categorized into the following;

- Project Site which included;
    - Kafue River Sub-catchment also encompassing the resettlement area
- Project area of influence which included;
    - Surrounding areas covering 5km in radius considered as immediate area of project influence

Figure 2-1 given below shows location of settlements within project area of influence.

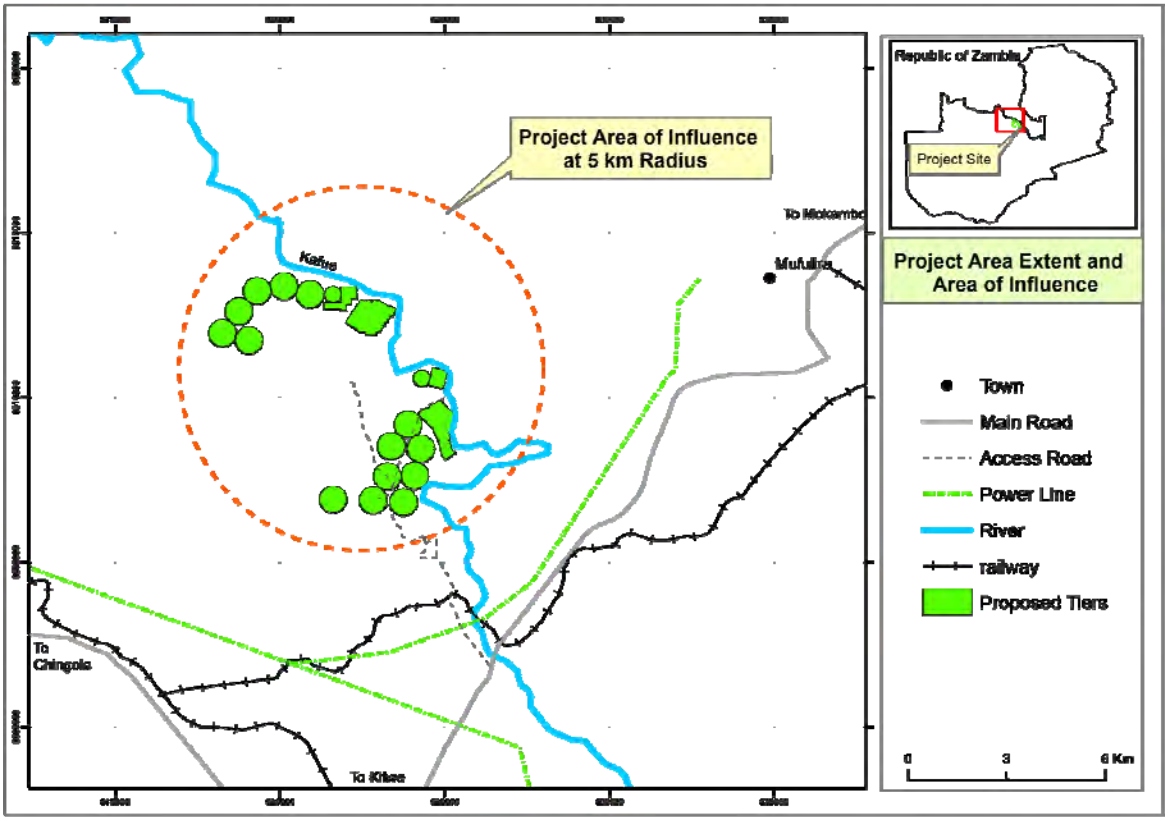

Figure 2-1: Map showing location of settlements within project area of influence

3. Additional Baseline information

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3.1 Vegetation Types and Classification

Musakashi is within the savannah woodland biome which is characterized by a grassy ground layer and a distinct upper layer of woody plants with interspaced trees that are adapted to frequent fires. The major vegetation type in Musakashi is Miombo woodlands with very few open grasslands and dambos almost confined to riverine areas. Bamboo was found to be the dominant grass species established. Much of the miombo woodland in the project area have vegetation that is in the secondary stage of maturity. Five vegetation types: Terminalia woodland, Miombo woodland, Mixed woodland and Riverine vegetation (Riparian) along streams and the Kafue River characterise the project area. In addition, Grasslands/semi-dambos was observed. See figure 3-1 for protected vegetation areas.

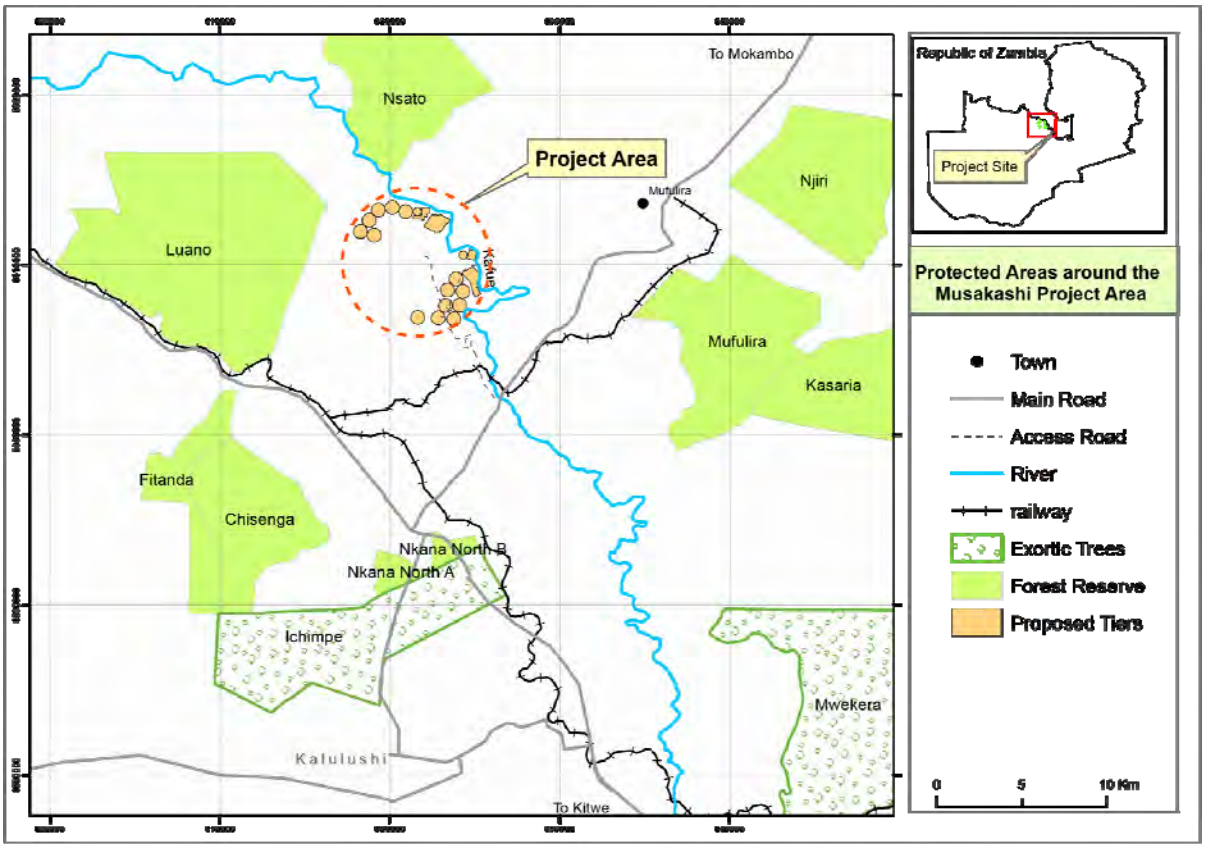


Figure 3-1: Map showing Protected Areas in relation to the Project Area.

3.2 FAUNA

Historically Musakashi area used to have most of commercially attractive mammals which are not present today. People sited the following animals as having been present in the past:

Table 3-1 Animals that existed before current

No.	Common Name	Scientific Name
1	Buffalo	*Syncerus caffer*
2	Eland	*Taurotragus oryx*
3	Elephant	*Loxodonta africana*
4	Hartebeest	*Sigmoceros lichtensteinii*
5	Kudu	*Tragelaphus strepsiceros*
6	Lion	*Panthera leo*
7	Rhinocerous	*Diceros bicornis*
8	Sable antelope	*Hippotragus niger*
9	Waterbuck	*Kobus ellipsiprymnus*
10	Wild Dog	*Lycaon pictus*

Almost all of the above species are now locally extinct. The most common reason cited to have caused extinction of these animal species is illegal hunting. Not all small mammals have gone into local extinction in the project area. A number of small mammal species still exist in the Musakashi area; although poaching continues to be the major threat to their survival and existence. Fauna habitats in the area has largely not been disturbed and much of it still remain unspoiled. The following animals were reported to exist in the area:

Table 3-2 Animals existing in Musakashi

No.	Common Name	Scientific Name
1	African Civet[s]	*Civettictis civetta*
2	Bush baby[s]	*Galago crassicaudatus*
3	Bush Squirel[s]	*Paraxerus cepapi*
4	Bushbuck[i]	*Tragelaphus scriptus*
5	Bushpig[i]	*Potamochoerus porcus*
6	Duikers Common[s]	*Sylvicapra grimmia*
7	Monkey vervet[s]	*Cercopithecus pygerythus*
8	Spring hares	*Pedetes capensis*
9	Warthog[i]	*Phacochoerus aethiopicus*

Animals physically observed during the field surveys included, *spring hare, Scrub hare, Bush Baby, African striped weasel, Vervet Monkeys, Chacma Baboons,* and the *African civet.*

Abundant woodland coupled with availability of water in the project area has created a perfect habitat for birdlife. Woodland birds like Eagles, Buzzards, Francolins, Quails, Pigeons and doves, Louries and Rollers were observed while sounds of Honeys guides, and Hornbills were heard. During the survey the following bird species were observed:

Table 3-3 Birds observed during surveys

No.	Bird Species	Scientific Name
1	African Dater	*Anhinga rufa*
	African fish Eagle	*Haliaeetus vocifer*
2	African Pied Wagtail	*Motacilla arguimp*
3	Bateleur	*Terathopius ecaudatus*
4	Blue Waxbill	*Uraeginthus angolensis*
5	Common Bulbul	*pycnonotus barbatus*
6	Crowned Hornbill	*Tockus alboterminatus*
7	Emerald-spotted Dove	*Turtur chalcospilos*
8	Fork-tailed Drongo	*Dicrurus adsimilis*
9	Greater Honeyguide	*Indicator indicator*
10	Grey Lourie	*corthaixoides concolor*
11	Helmeted Guineafowl	*Numida meleagris*
12	Lilac-breasted Roller	*Coracias caudata*
13	Little Bee-eater	*Merops pusillus*
15	Miombo Grey Tit	*Parus griseiventris*
16	Miombo Rock Thrush	*Monicola angolensis*
17	Paradise Flycatcher	*Terpsiphone viridis*
18	Pied Crow	*Corvus albbus*
19	Red-eyed dove	*Streptopelia semitorrquata*
20	Reed Cormorant	*Phalacrocorax carbo*
21	Rufousbellied Tit	*Parus rufiventris*
22	Wattled lapwing	*Vanellus senegallus*
23	Tawny-flanked Prinia	*Prinia subflava*
24	Tropical Boubou	*Laniarius aethioipicus*
25	White stork	*Ciconia ciconia*

The figure below shows animal life within and around the project area.

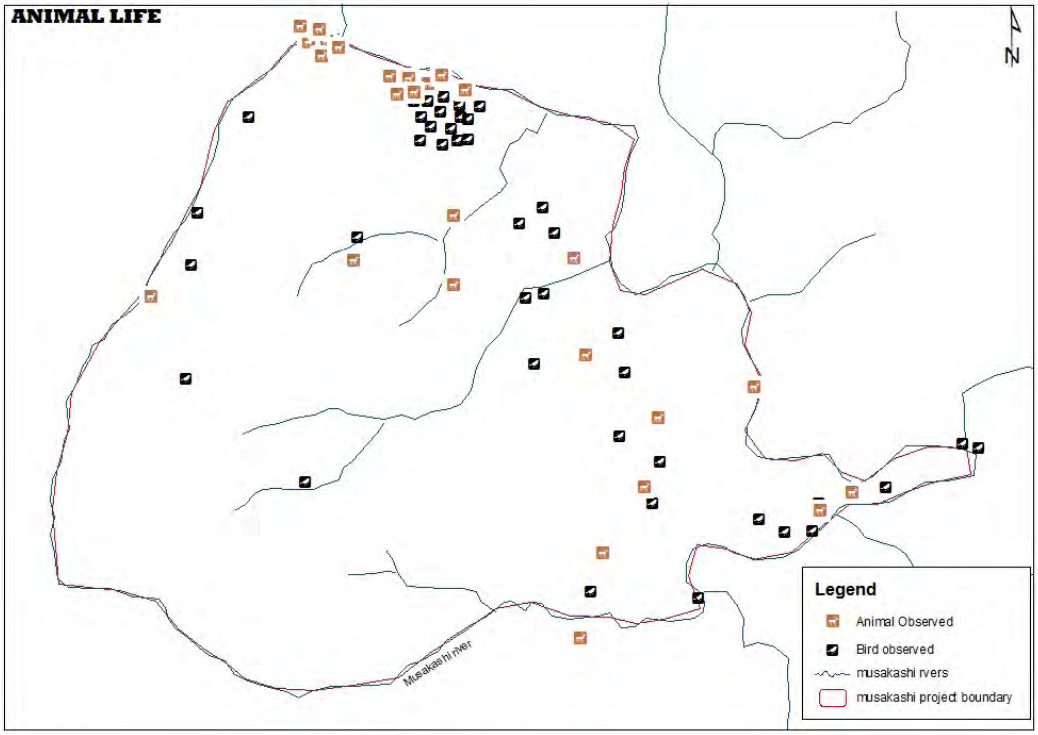
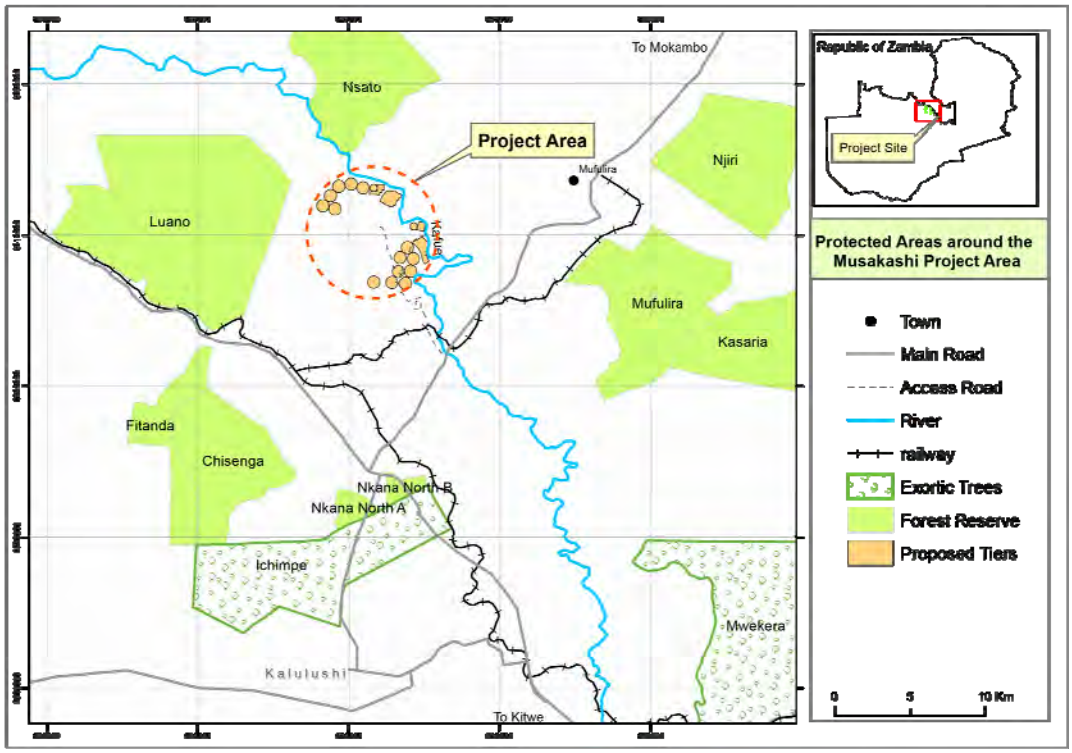


Figure 3-2 Map showing Animal Life within Project Area

3.3 Eco-System Sensitivity; Habitats and Species of Special Concern

The project site is surrounded by forest reserves; Luano, Mufulira, Nsato,Nkana North A & B Ichimpe and Mwekera. Ichimpe and Mwekera are exotic tree plantations meant to provide timber and logs for construction and other aspects of the industry. See Figure 3-3: Protected Areas around the Project.



Bamboos are a significant structural component of many forest ecosystems and play a major role in ecosystem dynamics. Bamboos play a critical role in stabilization of soils, especially those on steep slopes and river banks like owing to its extensive rhizome root systems of bamboos.

However, bamboos groves are freely-growing and widespread through the Copperbelt region and continue to support biodiversity, and available for livelihoods. The impact of clearing of bamboos for the proposed irrigation area remains negligible due to its expanse.

4. Environmental Management & Monitoring

4.1 Updated Environmental and Social Management Plan

An Environmental and Social Management plan (ESMP) has been updated taking into account the changes in the institutional arrangements and accountabilities for the project. The detailed procedures needed to address the project impacts and implement the proposed mitigation measures have been outlined in the ESMP. However, it might still be necessary to update the ESMP again in case of time lapse to ensure that prior to construction and operation by the Contractor and Operator respectively. This must be done in a manner satisfactory to the World Bank. The updated ESMP also sets out the budget for implementing the measures during construction and Operation.

Table 4-1 Environmental & Social Management Plan during the: preparation/construction phase

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMK
	Biophysical Environment							
	Preparation/Construction Phase							
Removal of vegetation	Disturbance of terrestrial ecological & ecosystem services processes	To ensure minimal loss of vegetation	Clearing of vegetation will only be confined to areas where irrigation facilities and associated facilities will be constructed. Ensure that when large areas are cleared for agriculture fields patches of vegetation connecting to each other through the area are left intact.	Proportion of land left as connecting corridors of vegetation	Contractor	Start of Clearing and levelling	Prior to construction	-
	Loss of natural habitat for small mammals, birds and insects.	To ensure minimal disturbance to the habitats	Avoiding clearing or damaging riparian vegetation where possible, and limit river and stream crossings as far as possible. Avoid blockage or diversion of rivers and streams where possible. Avoid indirect effect of run-off erosion and sedimentation from roads that may lead to loss of riparian habitats. Monitor and maintain riparian habitat corridors and waterways in adjacent areas to maintain faunal connectivity and migration.	Proportion of land secured against erosion and Area of land vegetation cover acting as habitat	Contractor PIU	Start of Clearing and levelling	Prior to construction	115,000

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMK
	Biophysical Environment Preparation/Construction Phase							
	Loss of species of special concern	To ensure minimal loss of vegetation	Clearing of vegetation will only be confined to areas where irrigation facilities and associated facilities will be constructed. Where possible avoid creating isolated 'islands' of Miombo habitat of less than 100 ha in extent as they will not serve as meaningful refugia for large mammals, snakes, etc	Proportion of land secured with intact Miombo vegetation Proportion of species of special concern	Contractor	Start of Clearing and levelling	Prior to construction	-
	Loss & fragmentation of sensitive habitats	To minimize clearance of vegetation	Clearing of vegetation will only be confined to areas where irrigation facilities and associated facilities will be constructed. Avoid indirect effect of run-off erosion and sedimentation from roads that may lead to loss of riparian habitats. Monitor and maintain riparian habitat corridors and waterways in adjacent areas to maintain faunal connectivity and migration.	Proportion of land under vegetation	Contractor	Start of Clearing and levelling	Prior to construction	150,000
	Loss of Fauna diversity	To ensure minimum loss of habitat	Clearing of vegetation will only be confined to areas where irrigation facilities and associated facilities will be constructed. Habitat connectivity,	Proportion of land left as connecting corridors of vegetation acting as	Contractor	Start of Clearing and levelling	Prior to construction	-

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMK
	Biophysical Environment Preparation/Construction Phase							
			particularly to protected areas, via habitat corridors (is maintained. Undertake habitat clearance only during winter when birds are not breeding.	habitat				
	Erosion of top soil	To limit clearance of vegetation to critical areas	Clearing of vegetation will only be confined to areas where irrigation facilities and associated facilities will be constructed. Ensure application of good agricultural practices that prevent soil loss and embark on community programmes that will sensitize communities in surrounding areas using inappropriate methods of farming leading to erosion and river siltation. Use of contour ridges where required, and well-designed drains for Tier 1 hose-furrow areas. Making-good of borrow pits with topsoil and vegetation.	Proportion of land secured against erosion Proportion of land left as under vegetation cover Soil loss due to erosion (Tons/ha)	Contractor PIU	Start of Clearing and levelling	Prior to construction	250,000
Spills and/or accidental releases.	Pollution of surface water as a result of spills	To prevent contamination of water as a result of oil spills.	Oils will be stored and used only in designated areas at the workshops. Dispose any used oil at a designated place in accordance with the law.	Number of spills recorded per quarter	Contractor	Prior to construction	On-going	50,000

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMK
	Biophysical Environment Preparation/Construction Phase							
	Contamination of Soil	To prevent contamination of soil	All contaminated soil will be treated. The valuable top soil, containing organic material, nutrients as well as seeds and the soil fauna, will be excavated separately. This will be piled in an adequate manner for reuse. After completion of the construction works the contractor will ensure immediate restoration by spreading piled top soil and by sowing adequate grass. Put up erosion control measures such as gabions and gunny bags filled with soil where there is erosion signs to slow down storm water flow in these sections during heavy rains.	Level of contaminants in the soil	Contractor	Start of Vegetation clearing Activities	On-going	330,000
	Pollution of groundwater	To avoid groundwater pollution		budget allocated to environmental management				
Use of equipment and vehicles	Contamination of soil, surface water and/or groundwater due to fuel spills	To prevent the contamination of water and soil as a result of spills and leakages from machines.	Regular servicing and maintenance of equipment and vehicles.	Number of equipment/ machinery emitting smoke	Contractor	Start of clearing activities	On-going	• 170,000
Noise emission and vibration	Noise pollution from the movement of the site	To minimize noise emission and vibration	All mobile vehicles and equipment will have noise reducers. All land preparation activities will take place	Level of noise during operations	Contractor	At start of land clearing	End of construction	65,000

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMK
	Biophysical Environment							
	Preparation/Construction Phase							
	vehicles can disturb workers, community		during the day and any work during night-time will be communicated to the state authorities and local community.					
Atmospheric emissions	Nuisance dust pollutes the air, affect the health of site workers	To reduce dust emissions during construction	Water bowsers will be employed on site to suppress dust on all site roads. Designated routes will be established on site for motor traffic. Site workers will be issued with personal protective attire. All the sand or soil heaps will be removed as soon as possible to avoid nuisance dust arising from prevailing.	Level air emissions in the area	Contractor	At start of land clearing	End of construction	230,000
	Increased road traffic will lead to deterioration of dirty irrigation scheme roads	To prevent and minimize damage of dirty roads resulting from traffic	Conduct routine road repair and maintenance.	State of roads within the project area	Contractor	At start of land clearing	End of construction	350,000
Safety	Increased in road traffic may lead to reduced road safety among the rural communities	To reduce road traffic accidents	Control traffic by introducing speed-humps and elaborate road signs. Road will maintained free of mud, pot-holes, debris and other traffic obstacles.	Number of accidents recorded	Contractor	At start of land clearing	End of construction	-

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMK
	Biophysical Environment Preparation/Construction Phase							
			Sensitize the community on general road safety to increasing traffic awareness.					

Figure 4-1 Environmental & Social Management Plan during the preparation/construction phase

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	Time Frame End	Cost ZMW
Socio-economic Environment								
Site Clearing/Construction Phase								
Improved Livelihoods	Increased employment opportunities for locals	To increase employment opportunities for the local people in the area	Priority will be given to the local people. Only skills that will not be available within the local community will be sourced from other areas. Skills base for the area will be increased by training the locals especially those skills that can be mastered within a short time.	Number of people employed	Contractor	Prior to construction	On-going	160,000
	Increased opportunities for skills transfer	To encourage training of staff on site	Ensuring there is a skill transfer programme. Categorize staff and each group to be supervised by a dedicated skilled personnel to ensure on job training. Encourage job on training through observation and trial under supervision.	Level of skills among locals	Contractor	Prior to construction	On-going	110,000
Revenue for the government from taxes	Increased revenue base for the government	To enhance the tax base for the government for infrastructure development	The Scheme will adhere to all the tax requirements of the Government of the Republic of Zambia.	Tax compliance level at the scheme	Contractor	Prior to construction	On-going	-
Migration	Increase in the local population	To reduce pressure on local resources	Measures will include) Adopt selective employment opportunities targeting locals, ii) Ensure adequate facilities are provided for staff such as sanitation facilities.	Level of depletion of natural resources in the area	Contractor	Prior to construction	On-going	75,000
	Increase in Local Economic Activities	To increase the market for local goods and services in	To enhance this, developer will ensue that the employees are encouraged to buy most things from within the area. The developer will support improvement of market facilities in the area	Capacity of markets to adsorb products	Contractor	Start of clearing	On-going	185,000

Environmental Aspect/issue	Environmental Impact	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	Time Frame End	Cost ZMW
			Socio-economic Environment					
			Site Clearing/Construction Phase					
		the area						
	Threat to Human Health	To reduce the incidences of HIV/AIDS	Construction activities will expose the community to the non-local people which may lead to the spread of HIV/AIDS and other STIs. Measures to minimize this will include; i) sensitize staff and community on the dangers of HIV/AIDs and STIs ii) support local programmes by Ministry of Health regarding HIV/AIDs	Number of new effections in the area	Contractor PIU	Prior to construction	On-going	275,000
Occupational Health & Safety	Increased lung problems due to dust emissions	To reduce the incidences of lung problems	Watering of the area and surroundings during the construction stage will be undertaken regularly.	Number of new cases of lund infections in the area	Contractor	Start of Clearing	On-going	160,000
Land Clearing for scheme development	Loss of grazing land	To limit clearing of vegetation to critical areas only	Designate some areas for grazing coupled with cultivated land for pasture	Proportion of grazing land left	PIU	Start of Clearing	On-going	-

Table 4-2 Environmental & Social Management Plan during the operation phase

Environmental Aspect/issue	Environmental Impact Biophysical Environment Operation Phase	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMW
Spills and/or accidental releases.	Pollution of surface water as a result of soil erosion	To prevent contamination of water as a result of soil erosion.	Ensure that all people at the farm are trained in handling chemicals/oils and so that no accidental spills are experienced	Proportion of land secured against erosion	Operator	Year 1	On-going	65,000
Use of equipment and vehicles	Contamination of soil, surface water and/or groundwater due to fuel spills	To prevent the contamination of water and soil as a result of spills and leakages from machines.	Regular servicing and maintenance of equipment and vehicles.	Pollution level in water sources Existence of pollution sources	Operator	Year 1	On-going	170,000
	Contamination of surface water and/ground water due to washing and servicing of equipment	To prevent the contamination of water as a result of washing and servicing of farm equipment.	All maintenance will be done in workshops. Hydrocarbon traps will be installed in the workshop drainage system to treat effluent prior to release to the farm surface drainage.			Year 1	On-going	80,000
	Contamination of water as a result of washing and servicing of equipment		Heavy equipment wash-bays equipped with impervious surfaces and containment to capture effluent from washing operations will be constructed at the open pit workshops			Year 1	On-going	140,000
Atmospheric emissions	Air pollution due to airborne dust generated from the operation of heavy farm equipment used in land clearance.	To minimize atmospheric pollution due emissions from vehicles and other machines	Regular servicing of vehicles and equipment	Level of air emissions	Operator	Year 1	On-going	170,000

Environmental Aspect/issue	Environmental Impact Biophysical Environment Operation Phase	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMW
	Air pollution	To control/minimize the generation of dust from the movement of haul trucks and other heavy equipment for construction	The site will be routinely sprayed with water in order to suppress dust during operations phase	Level of dust emissions Number of times water is sprayed	Operator	Year 1	On-going	165,000
Soil Degradation	Soil Contamination due to oil spills	To prevent contamination of soils at the workshop.	The service, repair and maintenance of farm equipment and vehicles will be restricted to dedicated areas specifically designed for the purpose.	Number of spills recorded per quarter	Operator	Year 1	On-going	160,000
	Contamination of Soil from disposal of agro-chemicals/ containers	To prevent contamination of soil caused by an accidental release of fuel or oil.	All scheme equipment using hydraulic fluid, oil, fuel or any other substance that has the potential to contaminate surface water, groundwater or soil if released into the environment will be subject to a preventative maintenance programme. Procedures laid down in the Emergency Response Plan will be followed in the event of a spill. IPM training	Availability of disposal site Availability of waste disposal guidelines	Operator	Year 1	On-going	-
Chemical pollution	Increased usage of fertilizers and agro-chemicals	To ensure usage of agrochemicals/ fertilizers is according to standards	Promote use of organic manures Practice conservation and green farming, Encourage organic farming, careful choice of crops which replenish soil fertility	Tons of fertilizers used	Operator	From operation	On-going	-
Water Quality Monitoring	Increased economic activity in the surrounding area including	To ensure that water in the river is of acceptable standard	Development a comprehensive water quality monitoring plan for both surface and groundwater	Presence of heavy metals	PIU	Prior to Operation		!40,000

Environmental Aspect/issue	Environmental Impact Biophysical Environment Operation Phase	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Time Frame Start	End	Cost ZMW
	mining							
Climate Change	Loss of vegetation	To minimize loss of vegetation	Reforestate disturbed areas where appropriate Minimize clearance of vegetation to critical areas Facilitate the planting of village woodlots within surrounding communities to offset loss associated with cleared areas. Avoid clearing woodlands which are in a mature or climax state Ensure use of well maintained, high efficiency diesel motors Prevent harvest of fuel wood or utilize charcoal from unsustainable harvesting	Proportion of vegetation left intact	Operator	Prior to land clearing	On going	155,000

Table 4-3 Environmental & Social Management Plan during the operation phase

Environmental Aspect/issue	Environmental Impact Socio-economic Environment Operation Phase	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Timing Start	End	Cost ZMW
Improved Livelihoods	Increased employment opportunities for locals	To increase employment opportunities for the local people in the area	Priority will be given to the local people. Only skills that will not be available within the local community will be sourced from other areas. Skills base for the area will be increased by training the locals especially those skills that can be mastered within a short time.	Number of locals employed	Operator	Year 1	On-going	110,000
	Increased opportunities for skills transfer	To encourage training of staff on site	Ensuring there is a skill transfer programme. Categorize staff and each group to be supervised by a dedicated skilled personnel to ensure on job training. Encourage job on training through observation and trial under supervision.	Availability of various Skills among locals	Operator	Year 1	On-going	-
Land	loss of agricultural fields	To ensure affected households are not left worse off than before	Compensation and replacement of land will be done after a RAP exercise is undertaken	% number of disputes relating to compensation Level of improvement in lifestyle	PIU	Year 1	Farm Closure	-
Revenue for the government	Increased revenue base for the government	To enhance the tax base for the government for infrastructure development	The Irrigation scheme will adhere to all the tax requirements of the Government of the Republic of Zambia.	tax compliance level for the scheme	PIU	Year 1	On-going	-
Migration	Increase in the local	To reduce pressure on	Measures will include) Adopt selective employment opportunities targeting	Number of new	Operator	Prior to construction	On-going	-

Environmental Aspect/issue	Environmental Impact Socio-economic Environment Operation Phase	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Timing Start	End	Cost ZMW
	population	local resources	locals, ii) Ensure adequate facilities are provided for staff such as sanitation facilities.	immigrates to the area				
	Increase in Local Economic Activities	To increase the market for local goods and services in the area	To enhance this, MAL will ensue that the employees are encouraged to buy most things from within the area. The Scheme will support improvement of market facilities in the area	Level of improvement in livehood for local people % reduction in the number of none school going children	PIU	Start of clearing	On-going	185,000
	Threat to Human Health	To reduce the incidences of HIV/AIDS	Construction and operation activities will expose the community to the non-local people which may lead to the spread of HIV/AIDS and other STIs. Measures to minimize this will include; i) sensitize staff and community on the dangers of HIV/AIDs and STIs ii) support local programmes by Ministry of Health regarding HIV/AIDs	Number of new effections of HIV/AIDs Number of HIV/AIDs programmes supported per quarter	Operator PIU	Prior to construction	On-going	140,000
Poor Sanitation	Pollution of surface and groundwater	To avoid depletion of water resources due to contamination	Provide adequate sanitation facilities and proper disposal of waste. Ensure communities are sensitized on good hygiene practices	Number of sanitary facilities available State of sanitary facilities	Operator	Start of Clearing	On-going	60,000
Occupational Health	Health related diseases for workers	To minimize any health hazards to	Ensure working environment is well kept and conducive for workers	Number of new cases recorded	Operator			135,000

Environmental Aspect/issue	Environmental Impact Socio-economic Environment Operation Phase	Management Objectives	Mitigation/Enhancement Measures	Performance Indicators	Responsible person	Timing Start	End	Cost ZMW
		workers	Provide personal protective clothing Develop and implement programmes for community awareness and training of workers on safety procedures	Number of staff complaining of chest health problems				
Human Animal Conflict	Threat to human safety	To prevent risk of animal attach	Provide for undisturbed stretches of vegetation interconnected to provide animal passage	Number of cases of animal human confrontations recorded	Operator PIU			-

4.2 Environmental Monitoring Plan

Under the Environmental Monitoring Plan (EMP), various mitigation measures have been organised into a well-formulated plan, which will serve as a guide for operation phase. While costs associated with implementing the EMP are often deemed unnecessary it's important that adequate resources are allocated to implementation of the EMP in order to comply with the monitoring commitments in the EMP as well as ensuring that unexpected effects resulting from operational activities are detected early enough for mitigation without causing irreversible damage to the environment.

Table 4-4 Environmental Monitoring Programme

Program	Description	Monitoring Location	Frequency	Parameters	Compliance Requirement	Responsible Person	Cost ZMK
Surface water Monitoring	Ambient surface water quality – upstream and downstream of the area of disturbance	Kafue River, Upstream and Downstream of reservoirs	Monthly	pH, EC, TDS, TSS,SO4, Cu, Fe, Co, Mn, NO2, PO4, Ca-Hardness, Ca, Mg, Pb, Co, Cd Pesticides	Key statutory limits that will be adhered to include the Statutory Limits for effluent discharged to surface waters.	Operator PIU	35,000
Biological Monitoring	Aquatic and terrestrial flora and fauna	Location will be selected in line with the baseline assessment to monitor impacts on biological data	Bi-Annual	Selection of parameters to be determined in consultation with relevant regulatory authorities to ensure potential impacts are detected.	Compliance requirements – to minimize impacts and compare to baseline environmental data.	Operator	60,000
Land Monitoring	Areas disturbed and rehabilitated	Entire Scheme area	Up-dated annually	Record area disturbed versus area rehabilitated.		Operator	-
	Success of rehabilitation	Plots will be determined once rehabilitation has begun and will include analogue sites in undisturbed areas.	Annually	To be determined, will include: Erosion rates, growth rates, species richness, important values, species dominance etc.	To meet stable, sustainable landforms at closure.	OPerator	65,000

Program	Description	Monitoring Location	Frequency	Parameters	Compliance Requirement	Responsible Person	Cost ZMK
Air Emissions Monitoring	Meteorology	Put up a meteorological station within the Scheme area	Continuous	Temperature Rainfall Humidity Wind (speed, direction) Pressure Evaporation	No compliance requirements – monitoring of natural conditions to supplement other monitoring including runoff volumes, ambient dust loads and noise levels.	Operator	150,000
	Ambient dust	Locations will be established around the area of disturbance to record ambient dust levels – mostly during construction phase	Monthly totals	Total dust levels	Statutory dust emission limits as detailed in Pollution Control Regulations – Third Schedule	Operator	10,000
Noise	Ambient and point Source	Construction areas	Monthly	Survey undertaken quarterly to record noise levels in comparison to baseline measurements.	Statutory limit for noise levels	Operator	515000
	Traffic	Consistent with baseline monitoring program	Annually	Vehicle movements	No compliance requirements – to monitor impacts and ensure mitigation measures are appropriate.	Operator	-