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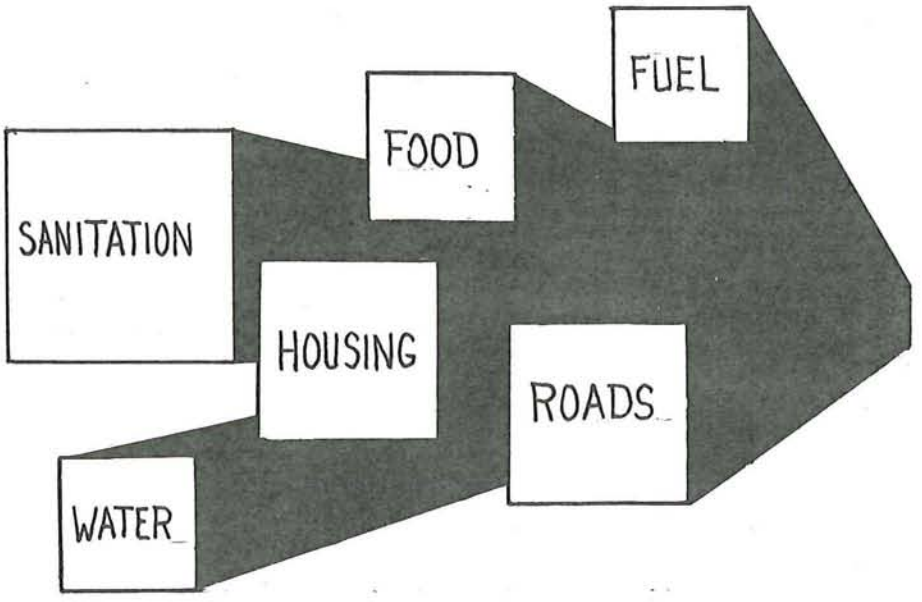
SUPPLEMENT TO GRADUATION REPORT

VILLAGE STUDIES



A CONTRIBUTE TO SARVODAYA SHRAMADANA
MORATUWA 1987

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1. INTRODUCTION

This paper has been produced to supplement the graduation report titled 'Village Studies', - A contribution to Sarvodaya Shramadana, Moratuwa 1986.

A number of chapters in the graduation report deal with research themes on Basic Human Needs and for the village of Bogahatota, which was selected as primary study-area, the themes describe how these Needs are being met and how they can be better satisfied by the community itself with help of Sarvodaya assistance.

The different research themes are more or less being treated with seperately, and in indicating proposals for the improved satisfaction of Needs certain basic theme aspects have indeed been interrelated, but an examination into any possible connection between the themes has not been exercised explicitly.
Tracing these connections certainly is important, since the aim is ultimately to seek a balanced integration of different Needs.

Moreover, in the practise of involving local groups in activity planning, it is most desirable to be able to indicate certain connections between Need aspects. Such indications, without being top-down impositions, can be conducive to help develop insight and understanding among the local participant beneficiaries into the restrictions as well as the possibilities of satisfying some particular Needs.

Not having addressed connections between the different research themes sufficiently was a major comment mentioned by the assisting graduation professors; hence the request was made to address this as yet.

2. METHOD FOR IDENTIFICATION OF THEME CONNECTIONS

In order to examine connections between the different research themes on Basic Needs use is being made of a Relation Scheme.
In the Scheme a number of aspects per Basic Need and other related village aspects can be listed.
Some of the aspects will be variable while others have more fixed properties, but in keeping within the frame-work of Physical and Technical Planning those aspects are being selected which obviously do relate to or inhibit spatial properties.

Subsequently, by relating each and every aspect, the existence of possible connections can be examined and their nature described, taking the form of restrictions, needs, means, goals or even concrete demands.
And these can be called upon in the exercise of designing alternative solutions for the spatial lay out of the physical village environment.

3. THE THEMES SELECTED

I have confined myself to examine connections between the following themes on Basic Needs:

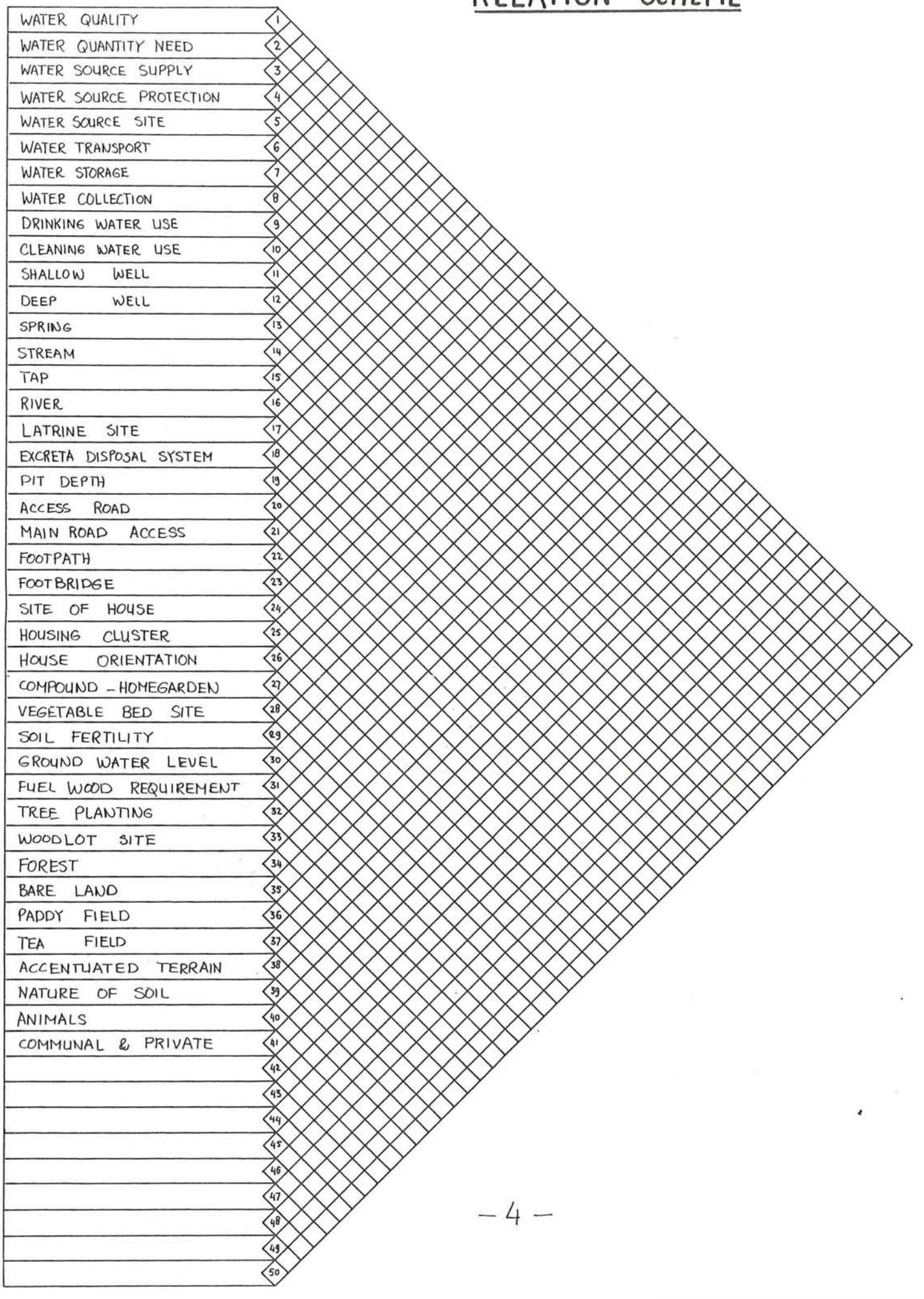
- (Drinking) Water
- Sanitation
- Roads
- Housing
- Food (vegetable gardening)
- Energy (fuelwood)

4. THE ASPECTS SELECTED

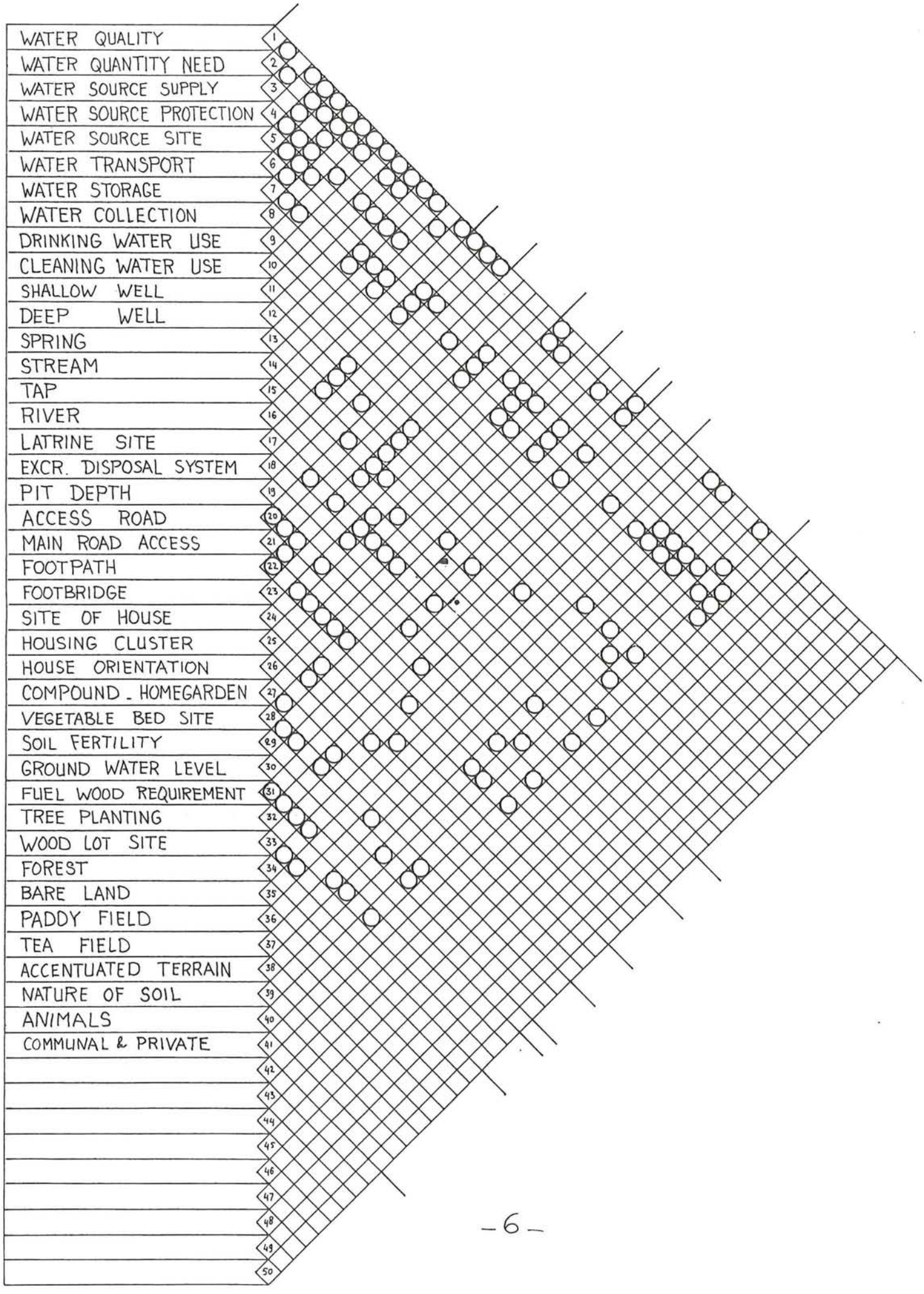
The aspects selected have been kept limited. The number listed may not be complete and more might be added.

Some external village aspects like the facilities for shopping, health-care, formal education, postal services, etc. have been placed under 'Main Road Access'.

RELATION SCHEME



5. THE RELATIONS INDICATED AND DESCRIBED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1. WATER QUALITY

- Rel: (01-02) Water quantity need
  The use of sufficient water of safe quality will contribute to sustain conditions for good personal health.
- Rel: (01-04) Water source protection
  Suitable measures for source protection can preserve the original water quality produced by the source.
- Rel: (01-05) Water source site
  By avoiding activities and situations that may pollute the water source or by selecting a suitable source site a desired water quality may be secured.
- Rel: (01-06) Water transport
  A better water quality from elsewhere can be transported towards the household users.
  But the method of transport may also affect the original quality of the water and quality improvement may than be considered.
- Rel: (01-07) Water storage
  Through storage the water quality may decrease, but the storage facility may also function to improve the water quality.
- Rel: (01-08) Water collection
  In case of roof collected rain water.
  The rain water collected in the first few minutes cannot be regarded as safe for consumption.
- Rel: (01-09) Drinking water use
  Drinking water should be of pure quality
- Rel: (01-10) Cleaning water use
  Water used for the purpose of washing, bathing, flushing, watering and domestic cleaning can be of lesser quality than water for drinking.
- Rel: (01-11) Shallow well
  The quality of ground water which appears in a shallow well is easily affected by land use activities around the well site.
- Rel: (01-12) Deep well
  The quality of ground water which appears in a deep well can generally be considered as safe.
- Rel: (01-13) Spring
  If land use activities in the spring vicinity are not polluting than spring water can be considered as safe.
- Rel: (01-14) Stream
  The original water quality from up-streams that emerge from the forest can generally be regarded as reasonably safe, whereas down steam water is no more suitable for consumption.
- Rel: (01-16) River
  River water is of an unreliable quality; not even suitable to be used for personal hygiene.
- Rel: (01-17) Latrine site
  Around a latrine the ground water quality can become polluted.

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- Rel: (01-18) Excreta disposal system
  For flushing a water-sealed toilet a lower water quality can be used.
- Rel: (01-19) Pit depth
  When latrine pits are more shallow and the ground water level below more deep, than the ground water quality may become less or not affected depending soil conditions.
- Rel: (01-24) Site of house
  Activities around the house may pollute the soil and thus contribute to ground water pollution.
- Rel: (01-30) Ground water level
  Deep ground water is generally of pure quality, whereas shallow found ground water may become easily affected by land use activities.
- Rel: (01-36) Paddy field
  For paddy cultivation several chemicals are used which pollute surface and ground water.
- Rel: (01-37) Tea field
  For tea cultivation several chemicals are used which washed off with run off rain water will flow to streams and/or reach the more shallow ground water in lower elevation, and thus contribute to pollution of water quality.
- Rel: (01-39) Animals
  Animals going astray may cause water source pollution.

2. WATER QUANTITY NEED

- Rel: (02-01) Water quality
  The use of sufficient water of safe quality will contribute to sustain conditions for good personal health.
- Rel: (02-03) Water source supply
  A particular source may not supply the required quantity needed by the household users.
- Rel: (02-05) Water source site
  The selection of a suitable new water source site could possibly mean that a required need of water quantity can be met.
- Rel: (02-06) Water transport
  Water can be transported by means of pipes, tubes and bamboo so as to meet the demand.
- Rel: (02-07) Water storage
  Water can be stored so as to meet the demand
- Rel: (02-08) Water collection
  Rain water collection can be a (additional) method to meet in the need for water.
- Rel: (02-09) Drinking water use
  The average per capita consumption of drinking water in the Bogahatota village was roughly computed at 5 ltrs a day. For an average household of 5 persons this will be 25 ltrs a day.
- Rel: (02-11) Shallow well
  The well depth should be about 2 mtrs below the lowest ground water level which will occur in the dry season so as to obtain sufficient water during that time.
- Rel: (02-12) Deep well
  Same as above.
- Rel: (02-16) Taps
  Taps should be fitted at desired walking distances from the household users.
- Rel: (02-24) Site of house
  Sufficient water should be available for use within desired walking distances from the houses.
- Rel: (02-25) Housing cluster
  Same as above.
- Rel: (02-28) Vegetable bed site
  Sufficient water should be available for watering vegetable beds and other garden species.
- Rel: (02-30) Ground water level
  Much well water withdrawal will lower the groundwater level around the immediate source vicinity.

3. WATER SOURCE SUPPLY

- Rel: (03-02) Water quantity need
  A particular source may not supply the required quantity needed by the household users.
- Rel: (03-05) Water source site (selection)
  A possible expected source supply for a desired purpose of water use should determine the selection of a new source site.
- Rel: (03-06) Water transport
  Water transport should be considered only from sources that will supply sufficient water.
- Rel: (03-07) Water storage
  Where the source supply is too little, water storage can be considered.

4. WATER SOURCE PROTECTION

- Rel: (04-01) Water quality
  Suitable measures for source protection can preserve the original water quality produced by the source.
- Rel: (04-05) Water source site
  The source site conditions will also determine the protection measures that can possibly be applied.
- Rel: (04-06) Water transport
  The inlet of the water transport system can be part of the constructed protection measure; (e.g. in case of spring protection)
- Rel: (04-07) Water storage
  Source protection measures may imply water storage, and a storage facility can be constructed to function as a protected source.
- Rel: (04-09) Drinking water use
  It is desirable to consider suitable protection measures for a source when its water will be used for consumption.
- Rel: (04-11) Shallow well
  Different measures can be applied to protect a shallow well
- Rel: (04-12) Deep well
  Different measures can be applied to protect a deep well
- Rel: (04-13) Spring
  Different measures can be applied to protect a spring
- Rel: (04-14) Stream
  Different measures can be applied to protect a stream
- Rel: (04-40) Animals
  Adequate protection measures have to be taken to prevent animals from polluting a water source.

5. WATER SOURCE SITE

- Rel: (05-01) Water quality
  By avoiding activities and situations that may pollute the water source or by selecting a suitable water source site a desired water quality may be secured.
- Rel: (05-02) Water quantity need
  The selection of a suitable new water source site could possibly mean that a required need of water quantity can be met.
- Rel: (05-03) Water source supply
  A possible expected source supply for a desired purpose of water use should determine the selection of a new source site.
- Rel: (05-04) Water source protection
  The source site conditions will also determine the protection measures that can possibly be applied.
- Rel: (05-06) Water transport
  Whether water transport can be considered may be dependent on the location of the source site.
- Rel: (05-07) Water storage
  The selection of a particular source site may imply the possibility of water storage.
- Rel: (05-08) Water collection
  Rain water collection should be considered when the nearest available water source is situated too far away.
- Rel: (05-17) Latrine site
  In selecting a water source site the present sites of latrines have to be taken in account.
- Rel: (05-18) Excreta disposal system
  The use of a water-sealed system requires that a suitable source to obtain flushing water is nearby.
- Rel: (05-22) Footpath
  When water is to be carried in buckets footpaths access is necessary.
- Rel: (05-24) Site of house
  Sources to obtain water for different purposes of use should be situated within reasonable distance from the house.
- Rel: (05-25) Housing cluster
  Sources to obtain water for different purposes of use should be situated within the shortest possible average distance to the houses identified as cluster.
- Rel: (05-26) House orientation
  If possible water source sites should be situated towards the back yard of the houses.
- Rel: (05-28) Vegetable bed site
  To have vegetable beds situated close to a water source is desirable.
- Rel: (05-30) Ground water level
  Where ground water levels are high, well sites can be established easily.

- Rel: (05-36) Paddy field
  Well sites should be selected on a suitable distance from paddy fields so as to avoid well water pollution.
- Rel: (05-37) Tea field
  Around a drinking water source situated in a tea field, there should be sufficient open space where no chemical spraying will occur and where run off rain water can be effectively drained.
- Rel: (05-38) Accentuated terrain
  When water is to be carried, it is desirable to select a source site sothat walking across sloping terrain can be avoided as much as possible.
- Rel: (05-39) Nature of the soil
  The nature of the soil, top and deep soil, may influence the site selection of a water source.
- Rel: (05-41) Communal & Private
  Water sources situated on communal grounds can be commonly shared.

6. WATER TRANSPORT

- Rel: (06-01) Water quality
  A better water quality from elsewhere may be transported towards the household users.
  But the method may also affect the original water quality and water quality improvement may than be required.
- Rel: (06-02) Water quantity need
  Water can be transported by means of pipes, tubes and bamboo so as to meet a required demand in a better way.
- Rel: (06-04) Water source protection
  The inlet of a water transport system can be connected to the constructed protection measure; (e.g. in case of spring water transport).
- Rel: (06-05) Water source site
  Whether water transport can be considered from a particular source may depend on the location of the source.
- Rel: (06-07) Water storage
  A water transport system should be dimensioned so as to provide for sufficient storage to meet the required need of the household users.
- Rel: (06-13) Spring
  Emerging spring water may be transported by means of pipes, tubes or bamboo so as to bring it closer to the houses.
- Rel: (06-14) Stream
  Upstream water emerging from the forest can be tapped and transported by means of pipes, tubes and bamboo.
- Rel: (06-15) Taps
  Along a pipe-born water transport system, standpipes can be fitted on suitable intervals from which water can be tapped.

- Rel: (06-17) Latrine site
  Along a water transport system latrines can be situated so as to use tap water for toilet flushing.

- Rel: (06-20) Access road
  Adequate under passings should be selected and constructed when water transport systems have to cross the access road.

- Rel: (06-22) Footpaths
  Crossings between footpaths and watertransport systems have to be suitable selected and constructed.
  Such occasion however may be limited as much as possible by constructing parallel systems and by using sites of natural barriers such as the verges of streams.

- Rel: (06-25) Housing cluster
  A water transport system will be oriented towards the houses so as to provide the households with water within reasonable distance.

- Rel: (06-28) Vegetable bed site
  When the water supply quantity is sufficient, than vegetable beds could be situated along a water transport system sothat water could be tapped for watering.

- Rel: (06-38) Accentuated terrain
  Special engineering assistance will be required to project a closed pipe-born water transport system over accentuated terrain.
  An open water transport system using bamboo will have to make use of a constant fall in terrain height.

- Rel: (06-40) Animals
  A water transport system should be protected from damage and pollution by animals.

- Rel: (06-41) Communal & Private
  A water transport system constructed through shramadana by the users should be owned by the community.
  It should be projected as much as possible over communal grounds but it also may need to cross private property.

- Rel: (06-33) Wood lot site
  A water transport system should not go through a wood lot site unless sufficient passing width will be created.

- Rel: (06-35) Bare land
  Pipes can be laid in the soil of bare land but these sites should be clearly marked.

- Rel: (06-36) Paddy field
  Underground pipes should not be laid in paddy fields.

- Rel: (06-37) Tea field
  Pipes can be laid underground through a tea field, but the pipe track should be kept sufficiently free from cultivation.
  An open system should have sufficient height above the tea bushes.

7. WATER STORAGE

- Rel: (07-01) Water quality
  Through storage the water quality may decrease, but the storage facility may also function to improve the water quality.
- Rel: (07-02) Water quantity need
  Water can be stored so as to meet the demand.
- Rel: (07-03) Water source supply
  Where the source supply is too little, water storage can be considered.
- Rel: (07-04) Water source protection
  Source protection measures may imply water storage, and a storage facility may function as a protected water source.
- Rel: (07-05) Water source site
  The selection of a particular water source site may imply the possibility for water storage.
- Rel: (07-06) Water transport
  A water transport system should be dimensioned so as to provide for sufficient storage to meet the required water need of the household users.
- Rel: (07-08) Water collection
  Roof collected rain water implies immediate storage in a barrel or tank.
- Rel: (07-09) Drinking water use
  Storage facilities for the purpose of having drinking water available should provide for measures to secure the water quality.
- Rel: (07-13) Spring
  Water that emerges from a spring could be collected at the site in a storage tank.
- Rel: (07-15) Tap
  On a storage tank taps can be fitted to obtain water.
- Rel: (07-17) Latrine site
  Water may be stored close to a latrine for the purpose of toilet flushing.
- Rel: (07-22) Footpaths
  A water storage facility from which water is collected should be accessible by footpaths.
- Rel: (07-25) Housing cluster
  A water storage facility from which water is collected and carried should possibly be situated within the shortest average walking distance to the houses belonging to the cluster.
- Rel: (07-26) House orientation
  A water storage facility from which water is carried may possibly be situated towards the back-yard of the house(s).
- Rel: (07-28) Vegetable bed site
  Vegetable beds may be situated near a water storage facility from which surplus over-flow water could be used for watering or diverted in trenches for irrigation.

- Rel: (07-30) Ground water level
  Ground water is a natural form of water storage.
  Stream water can be infiltrated and raise the ground water level locally which could afterwards be tapped elsewhere.
- Rel: (07-41) Communal & Private
  A water storage facility should be owned by the builders/ users.

8. WATER COLLECTION (-Rain)

- Rel: (08-01) Water quality
  The roof collected rain water in the first few minutes can not be regarded as safe for consumption.
- Rel: (08-02) Water quantity need
  Roof collected rain water can be a (additional) method to have water nearby the home available, and meet part of the required water need.
- Rel: (08-05) Water source site
  Rain water collected from roofs may be considered when the nearest available water source is situated too far away.
- Rel: (08-07) Water storage
  Roof collected rain water implies immediate storage in a barrel or tank.

9. DRINKING WATER USE

- Rel: (09-01) Water quality
  Drinking water should be ~~of pure~~ pure of trustworthy quality
- Rel: (09-02) Water quantity need
  The average per capita consumption of drinking water per day in the Bogahatota village was roughly computed at 5 ltrs. For an average household of 5 persons this is 25 ltrs a day.
- Rel: (09-04) Water source protection
  It is desirable to apply suitable protection measures for a source when its water is used for consumption.
- Rel: (09-07) Water storage
  Storage facilities for the purpose of having drinking water available should provide for suitable measures to secure the water quality.

10. CLEANING WATER USE

- Rel: (10-01) Water quality
  Water used for the purposes of washing, bathing, flushing, watering and domestic cleaning can be of lesser quality than water for drinking.

11. SHALLOW WELL

- Rel: (11-01) Water quality
  The quality of ground water which appears in a shallow well is easily affected by land use activities around the well site.
- Rel: (11-02) Water quantity need
  The well depth should be about 2 mtrs below the lowest ground water level which will occur in the dry season so as to be able to obtain sufficient water during that period.
- Rel: (11-04) Water source protection
  Different measures can be applied to protect a shallow well.
- Rel: (11-17) Latrine site
  The presence of a latrine nearby can affect the quality of water in a shallow well.
- Rel: (11-22) Footpaths
  Footpath access to obtain water from a shallow well is necessary.
- Rel: (11-36) Paddy field
  Shallow water wells situated close to paddy fields are easily polluted by chemicals used for paddy cultivation.
- Rel: (11-38) Accentuated terrain
  Shallow water is more likely to be found in well pits dug in lower elevations
- Rel: (11-40) Animals
  Animals going astray may easily pollute water in shallow wells.

12. DEEP WELL

- Rel: (12-01) Water quality
  The quality of ground water which appears in a deep well can generally be considered as safe.
- Rel: (12-02) Water quantity need
  The well depth should be about 2 mtrs below the lowest ground water level which will occur in the dry season so as to be able to obtain sufficient water during that time.
- Rel: (12-04) Water source protection
  Different measures can be applied to protect a deep well.
- Rel: (12-19) Pit depth (of latrine)
  A dry shallow latrine pit may dependent on the soil conditions and the depth of the ground water level not pollute the water in a nearby situated deep well.
- Rel: (12-39) Nature of soil
  Possible expected rock formations in the sub soil may hamper the construction of a deep water well.
- Rel: (12-22)

13. SPRING

- Rel: (13-01) Water quality
  If land use activities within the spring provision are non polluting than spring water may be considered as safe.
- Rel: (13-04) Water source protection
  Different measures can be applied to protect a spring.
- Rel: (13-06) Water transport
  Emerging spring water may be transported by means of pipes, tubes or bamboo so as to bring it closer to the houses.
- Rel: (13-07) Water storage
  Water that emerges from a spring could be collected at the site in a storage tank.
- Rel: (13-22) Footpaths
- Rel: (13-40) Animals

14. STREAM

- Rel: (14-01) Water quality
  The original water quality from upstream which emerges from the forest can generally be regarded as reasonable safe, whereas down stream water is no more suitable for consumption.
- Rel: (14-04) Water source protection
  Different measures can be applied to protect a stream.
- Rel: (14-06) Water transport
  Upstream water emerging from the forest can be tapped and transported by means of pipes, tubes or bamboo.
- Rel: (14-20) Access road
  Where streams cross the village access road culverts need to be constructed.
- Rel: (14-22) Footpaths
  Suitable places have to be selected where footpaths have to cross streams
- Rel: (14-23) Footbridges
  On places where footpaths should cross streams it should be possible to construct simple footbridges which will provide for a safe passage.
- Rel: (14-28) Vegetable bed site.

15. TAPS

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- Rel: (15-02) Water quantity need
  Taps should be fitted at desired walking distances from the houses.
- Rel: (15-06) Water transport
  Along a pipe-born water transport system, stand pipes can be fitted on suitable intervals from which water can be tapped.

- Rel: (15-07) Water storage
  On a storage tank taps can be fitted to obtain water.
- Rel: (15-22) Footpaths
  A stand pipe should be accessible by footpaths
- Rel: (15-25) Housing cluster
  A stand pipe should be fitted within the shortest average walking distance from the houses identified in the cluster.
- Rel: (15-41) Communal & Private
  A stand pipe should preferably be situated on communal grounds and owned by the builders/users.

16. RIVER

- Rel: (16-01) Water quality
  River water is of an unreliable quality; not even suitable to be used for personal hygiene.

17. **LATRINE SITE**

- Rel: (17-01) Water quality
  Around a latrine the ground water when high will become polluted.
- Rel: (17-05) Water source site
  In selecting a latrine site the presence of water source sites have to be taken in account.
- Rel: (17-06) Water transport
  Along a water transport system latrines can be situated so as to tap water for toilet flushing.
- Rel: (17-07) Water storage
  Water may be stored close to a latrine for the purpose of toilet flushing.
- Rel: (17-11) Shallow well as Rel: (17-05)
- Rel: (17-12) Deep well as Rel: (17-05)
- Rel: (17-13) Spring as Rel: (17-05)
- Rel: (17-20) Access road
  A latrine should be situated on a suitable spot away from the public access road.
- Rel: (17-22) Footpaths
  A latrine should be accessible by a private footpath and situated on a spot away from public footpaths
- Rel: (17-24) Site of the house
  A latrine should be situated near the house.
- Rel: (17-25) Housing cluster
  Within a cluster of houses several latrines could be grouped together.

- Rel: (17-26) House orientation
  A latrine should preferably be oriented towards and accessible from the back yard of the house.
- Rel: (17-27) Compound
  A latrine should be situated within the households compound on a sheltered spot.
- Rel: (17-30) Ground water level
  Latrines should preferably be situated there where the ground water level is deep.
- Rel: (17-38) Accentuated terrain
  A latrine should preferably be situated below the house.
- Rel: (17-41) Communal & Private
  As Rel: (17-27) Compound.

18. EXCRETA DISPOSAL SYSTEM

- Rel: (18-01) Water quality
  For flushing a water-sealed toilet a lower water quality can be used.
- Rel: (18-05) Water source site
  The use of a water-sealed latrine requires that a suitable source to obtain flushing water is nearby.
- Rel: (18-24) Site of the house
  An open pit latrine should not be situated too close to the house with regard to the spread of odeurs and the attraction of flies.

19. Latrine PIT DEPTH

- Rel: (19-01) Water quality
  When latrine pits are more shallow and the ground water level below more deep, than the ground water quality may become less or depending on the soil conditions not at all affected.
- Rel: (19-12) Deep well
  As a result of conditions mentioned above, water in a deep well nearby may not be affected.
- Rel: (19-30) Ground water level
  It is desirable that latrine pit bottoms do not reach the ground water level.
- Rel: (19-39) Nature of soil
  Where rocky sub soil is expected it may be difficult to create sufficient pit depth.

20. ACCESS ROAD (The trace of the village access road has been decided upon already by the Society).

- Rel: (20-14) Stream
  Where streams cross the village access road culverts need to be installed.
- Rel: (20-17) Latrine site
  Latrines should be situated on suitable distances from the public access road.
- Rel: (20-20) Access road
  Connected to the village access road some minor wider earthen tracks could be constructed so as to provide for improved internal village access for bicycles, bullock carts and small tractors. A public private coach may ply on the access road.
- Rel: (20-21) Main road access
  It will not be expected that the village access road can be connected to the Main road through a motorable bridge.
- Rel: (20-22) Footpaths
  Public and semi-public footpaths will cross the village access road on many occasions.
- Rel: (20-24) Site of the houses
  Along the access road especially on communal grounds many more new houses may be built in future.
- Rel: (20-32) Tree planting
  Where possible shade trees could be planted along the access road and major minor tracks.
- Rel: (20-38) Accentuated terrain
  The slope of the road should be kept as little as possible for transport convenience and to prevent road-surface erosion through run off rain water.
- Rel: (20-41) Communal & Private
  The access road will be owned and has to be maintained by the community.

21. MAIN ROAD ACCESS

- Rel: (21-20) Access road
  It will not be expected that the village access road can be connected to the main road by a motorable bridge.
- Rel: (21-22) Footpaths
  The major public transit footpaths will have to be oriented towards the village access Gates so as to provide for access to the Main road.

22. FOOTPATH

- Rel: (22-05) Water source site
  Water sources from which water is carried need to be accessible by footpaths.
- Rel: (22-06) Water transport
  Crossings between footpaths and water transport systems have to be suitable selected and constructed.
  Such occasions however may be limited as much as possible by constructing parallel systems and by using sites of natural barriers such as the verges of streams.
- Rel: (22-07) Water storage
  Rel: (22-11) Shallow well
  Rel: (22-12) Deep well
  Rel: (22-15) Tap
  as Rel: (22-05) Water source site
- Rel: (22-14) Stream
  Suitable places have to be selected where footpaths should cross streams.
- Rel: (22-17) Latrine site
  A latrine should be accessible by a private footpath and situated on a spot away from public footpaths.
- Rel: (22-20) Access road
  Public and semi-public footpaths will cross the village access on many occasions.
- Rel: (22-21) Main road access
  The major public transit footpaths will have to be oriented towards the village access gates so as to provide for access to the Main road.
- Rel: (22-22) Footpaths
  The internal footpath structure should provide for adequate access within the village area.
- Rel: (22-24) Site of house
  Any house needs to be accessible by footpaths.
- Rel: (22-25) Housing cluster
  The internal footpath structure within a cluster may be connected to a cluster access footpath or widened track.
- Rel: (22-26) House orientation
  Public access to a house should be oriented towards the front yard.
- Rel: (22-27) Compound
  Compounds should not unnecessary be crossed by public footpaths, but between borders of compounds it may be considered to project footpaths to give better access to other enclosed compounds.
  Inter compound access for private use will occur.
- Rel: (22-28) Vegetable bed site
  Vegetable beds have to be accessible (also for wheel barrows).
- Rel: (22-33) Wood lot site
  Wood lot sites have to be made accessible by foothpaths or tracks passable for carts and small tractors.

- Rel: (22-38) Accentuated terrain
  Unless provided with stairs, footpaths should not be too steep, since they will become slippery and eroded by rain water.
- Rel: (22-39) Nature of soil
  Footpaths should be constructed over solid soil.
- Rel: (22-41) Communal & Private
  The internal footpath structure has to be maintained by the community.

23. FOOTBRIDGE

- Rel: (23-14) Streams
  On places where footpaths should cross streams it should be possible to construct simple footbridges which will provide for a safe passage.

24. SITE OF HOUSE

- Rel: (24-01) Water quality
  Activities around the house may pollute the soil and thus contribute to the pollution of ground water.
- Rel: (24-02) Water quantity need
  Sufficient water should be available for use within desired walking distances from the house.
- Rel: (24-05) Water source site
  Same as above.
- Rel: (24-17) Latrine site
  A latrine should be situated near the house.
- Rel: (24-18) Excreta disposal system
  An open pit latrine should not be situated too close to the house with regard to the spread of odors and the attraction of flies.
- Rel: (24-20) Access road
  Along the access road especially on communal grounds many more new houses will be built in future.
- Rel: (24-22) Footpath
  Any house needs to be accessible by footpaths.
- Rel: (24-28) Vegetable bed site
  Vegetable beds may be well situated in the vicinity of the house so as to facilitate maintenance and keep control.
- Rel: (24-16) River
  On certain parts along the river no houses should be built because of occasional flooding, unless mounds will be erected.

- Rel: (24-34) Forest
  No more new houses should be allowed to be built along the border of the forest in order to preserve it from new claims for cultivation.

25. HOUSING CLUSTER

- Rel: (25-02) Water quantity need
  Sufficient water should be available for use within desired walking distances from the houses.
- Rel: (25-05) Water source site
  Rel: (25-06) Water transport
  Rel: (25-07) Water storage
  Rel: (25-15) Taps
  same as Rel: (25-02)
- Rel: (25-17) Latrine site
  Within a cluster of houses several latrines could be grouped together.
- Rel: (25-22) Footpaths
  The internal footpath structure within a cluster may be connected to a cluster-access-footpath or a widened track.
- Rel: (25-28) Vegetable bed site
  Within a cluster of houses it may be considered to concentrate vegetable gardening on one spot.
- Rel: (25-33) Wood lot site
  Within a cluster of houses it may be possible to plant a wood lot plot.

26. HOUSE ORIENTATION

- Rel: (26-05) Water source site
  If possible water source sites should be oriented towards the back yard of the houses.
- Rel: (26-07) Water storage
  Rel: (26-17) Latrine sit
  Similar to rel: (26-05)
- Rel: (26-22) Footpaths
  Puplic access to a house should be oriented towards the front yard.

27. COMPOUND - HOMEGARDEN

- Rel: (27-17) Latrine site
  A latrine site should be situated within the household's compound.
- Rel: (27-22) Footpaths
  Compounds should not unnecessary be crossed by public footpaths, but between borders of compounds it may be considered to project semi-private footpaths so as to enable better access to other enclosed compounds. Inter compound access footpaths may occur.

- Rel: (27-28) Vegetable bed site
  Vegetable gardening, if practised, is likely to happen within the households compound.
- Rel: (27-32) Tree planting
  Where possible, extra fuel and timber wood trees could be planted in the compounds of households.

28. VEGETABLE BED SITE

- Rel: (28-02) Water quantity need
  Sufficient water should be available for watering vegetable beds and other garden species.
- Rel: (28-05) Water source site
  To have a water source situated close to vegetable beds is desirable.
- Rel: (28-06) Water transport (system)
  Rel: (28-07) Water storage (tank)
  Rel: (28-14) Stream (bank)
  Rel: (28-24) Site of house
  Similar as Rel: (28-05); Distance relation.
- Rel: (28-22) Footpath
  Vegetable beds have to be accessible (also for wheel barrows).
- Rel: (28-27) Compound - Homegarden
  Vegetable gardening, if practised, is most likely to happen within the households' compound.
- Rel: (28-29) Soil fertility
  Vegetable beds are preferably situated where the natural soil fertility is high.
- Rel: (28-30) Ground water level
  Vegetable beds are preferably situated where the ground water level is high.
- Rel: (28-32) Tree planting
  Near vegetable beds shade trees could be planted.
- Rel: (28-36) Paddy field
  Vegetables can be easily grown on widened bunds in paddy fields.
- Rel: (28-40) Animals
  Vegetable beds have to be protected from animals.

29. SOIL FERTILITY

- Rel: (29-28) Vegetable beds
  Where the natural soil fertility is high it is more preferred to establish vegetable beds.
- Rel: (29-38) Accentuated terrain
  Due to top soil erosion the fertility is generally higher at the hill-base near flat land.
- Rel: (29-40) Animals
  Animal dung is an important organic fertilizer.

30. GROUND WATER LEVEL

- Rel: (30-01) Water quality
  Deep ground water is generally of pure quality, whereas shallow found ground water may become easily affected by land use activities.
- Rel: (30-02) Water quantity need
  Much well water withdrawal will lower the ground water level around the immediate source vicinity.
- Rel: (30-05) Water source site
  Where ground water levels are high, well sites are established easily.
- Rel: (30-07) Water storage
  Ground water is a natural form of water storage.
  Infiltrated stream water would raise the ground water level locally which could be tapped elsewhere nearby (Rel: (30-14))
- Rel: (30-17) Latrine site
  Latrines should preferably be situated there where the ground water level is deep.
- Rel: (30-19) Latrine pit depth
  It is desirable that latrine pit bottoms should reach well above the highest ground water level.
- Rel: (30-28) Vegetable bed site
  Vegetable beds are preferably situated there where ground water levels are high.

31. FUEL WOOD REQUIREMENT

- Rel: (31-31) Fuel wood requirement
  The use of fuel efficient wood stoves will decrease the amount of trees to be cut, and thus the present demand for fuel wood.
- Rel: (31-32) Tree planting
  By planting out sufficient numbers of fire-wood trees the village could become self-sufficient in fuel wood production.
- Rel: (31-33) Wood lot site
  On suitable places wood lots could be planted to attain greater self-sufficiency; as Household wood lot, Neighbourhood wood lot, Village wood lot and Forest border wood lots.
- Rel: (31-34) Forest
  The forest should be protected from uncontrolled felling of trees for fuel wood consumption.
  Forest border planting and Forest reserve blocks have been suggested.

32. TREE PLANTING

- Rel: (32-20) Access road
  Where possible, shade trees could be planted along the village access road and major minor tracks.
- Rel: (32-27) Compound - Homegarden
  Where possible extra trees for fuel and timber use could be planted in the compounds of households.
- Rel: (32-28) Vegetable bed site
  Near vegetable beds shade trees could be planted.
- Rel: (32-37) Tea field
  It is suitable to interplant tea fields with ipilipile trees to fertilize the soil and for fuel wood and timber use.
- Rel: (32-38) Accentuated terrain
  It is suitable to plant trees on slopy hills in order to prevent top soil erosion.
- Rel: (32-40) Animals
  It is suitable to plant ipilipile trees ofwhich the leaves can be used as animal fodder.

33. WOOD LOT SITE

- Rel: (33-13) Spring
  Above a spring it may be suitable to plant a small wood lot so as to protect the spring supply area.
- Rel: (33-22) Footpaths
  Wood lot sites have to be made accessible by footpaths or tracks passable for carts and small tractors.
- Rel: (33-31) Fuel wood requirement
  On suitable places wood lots could be planted for the use of fuel wood and timber; as Household wood lot, Neighbourhood wood lot, Village wood lot, Forest border wood lot.
- Rel: (33-34) Forest
  Within the Forest certain blocks could be demarcated from which fuel wood can be collected, provided that replanting will be organised.
- Rel: (33-35) Bare land
  Uncultivated lands could be planted with village wood lots.

34. FOREST

- Rel: (34-24) Site of House
  No more new houses should be allowed to be built along the border of the forest in order to preserve it from new claims for (tea) cultivation.

- Rel: (34-31) Fuel wood requirement.
  The forest should be protected from uncontrolled felling of trees for fuel wood consumption.
  Forest border planting and Forest block reserve have been suggested.
- Rel: (34-33) Wood lot site
  Forest border planting and Forest block reserve as suggested above.

35. BARE LAND

- Rel: (35-06) Water transport
  Sites in bare land where pipes have been laid for water transport should be clearly marked.
- Rel: (35-33) Wood lot site
  Village wood lots could be planted on bare lands.

36. PADDY FIELD

- Rel: (36-01) Water quality
  For paddy cultivation chemicals are used which pollute ground water and surface waters.
- Rel: (36-05) Water source site
  Well sites should be selected on a suitable distance from paddy fields so as to avoid well water pollution.
- Rel: (36-06) Water transport
  Underground pipes for water transport should not be laid in paddy fields.
- Rel: (36-11) Shallow well
  Shallow well water close to paddy fields is not suitable for consumption. (Rel: (36-05)).
- Rel: (36-28) Vegetable bed site
  Vegetables can be easily grown on widened bunds in paddy fields.

37. TEA FIELD

- Rel: (37-01) Water quality
  For tea cultivation several chemicals are used which, washed off with run off rain water, will flow towards streams and/or reach the more shallow ground water in lower elevations, and thus contribute to the pollution of the water quality.
- Rel: (37-05) Water source site
  Around a drinking water source situated in a tea field, there should be sufficient space available where no chemical spraying will occur and where run off rain water can be easily drained.

- Rel: (37-06) Water transport
  The track in a tea field where pipes have been laid for water transport should be kept sufficiently free from cultivation.
  An open system should have sufficient height above the tea bushes.
- Rel: (37-32) Tree planting
  It is suitable to interplant tea fields with ipilipile trees to fertilize the soil and for fuel wood and timber use.

38. ACCENTUATED TERRAIN

- Rel: (38-05) Water source site (selection)
  When water is to be carried, it is desirable to select a source site sothat walking across sloping terrain can be avoided as much as possible.
- Rel: (38-06) Water transport
  Special engineering assistance will be required to project a closed pipe-born water transport system over accentuated terrain.
  An open water transport system using bamboo will have to make use of a constant fall in terrain height.
- Rel: (38-11) Shallow well
  Shallow water is more likely to be found in well pits dug in lower elevations.
- Rel: (38-17) Latrine site
  A latrine should preferably be situated below the house and below a water source.
- Rel: (38-20) Access road
  The slope of the village access road should be constructed as flat as possible for transport convenience and to prevent road-surface erosion through run off rain water.
- Rel: (38-22) Footpaths
  Unless provided with stairs, footpaths should not be too steep, since they will become slippery and eroded by run off rain water.
- Rel: (38-29) Soil fertility
  Due to top soil erosion the soil fertility is generally higher at the hill-base near flat land.
- Rel: (38-32) Tree planting
  It is suitable to plant trees on slopy hills in order to prevent top soil erosion.

39. NATURE OF SOIL

- Rel: (39-05) Water source site
  The nature of the soil, top and deep soil, may influence the site selection of a water source.
- Rel: (39-12) Deep well
  Rel: (39-19) Pit depth — Similar to Rel: (39-05)
- Rel: (39-22) Footpaths
  Footpaths should be constructed over solid soil.

40. ANIMALS

- Rel: (40-01) Water quality
  Animals going astray may cause water source pollution.
- Rel: (40-04) Water source protection
  Adequate protection measures should be taken to prevent animals from polluting a water source.
- Rel: (40-06) Water transport (system)
  A water transport system should be protected from damage by animals.
- Rel: (40-13) Spring
  Same as Rel: (40-04)
- Rel: (40-28) Vegetable bed site
  Vegetable beds have to be protected from animals.
- Rel: (40-29) Soil Fertility
  Animal cow dung is an important organic fertilizer.
- Rel: (40-32) Tree planting
  It is suitable to plant ipilipile trees ofwhich the leaves can be used as animal fodder.

41. COMMUNAL & PRIVATE

- Rel: (41-05) Water source site
  Water sources situated on communal grounds can be commonly shared.
- Rel: (41-06) Water transport (system)
  Rel: (41-07) Water storage (facility)
  Rel: (41-15) Taps — Similar to Rel: (41-05)
- Rel: (41-17) Latrine site
  Common use of one latrine by different families is not considered.
- Rel: (41-20) Village access road
  The community is responsible for the road maintenance.
- Rel: (41-22) Footpaths
  Similar to above.

6. INDICATIONS ON SPATIAL DESIGNS at village scale - and neighbourhood scale level.

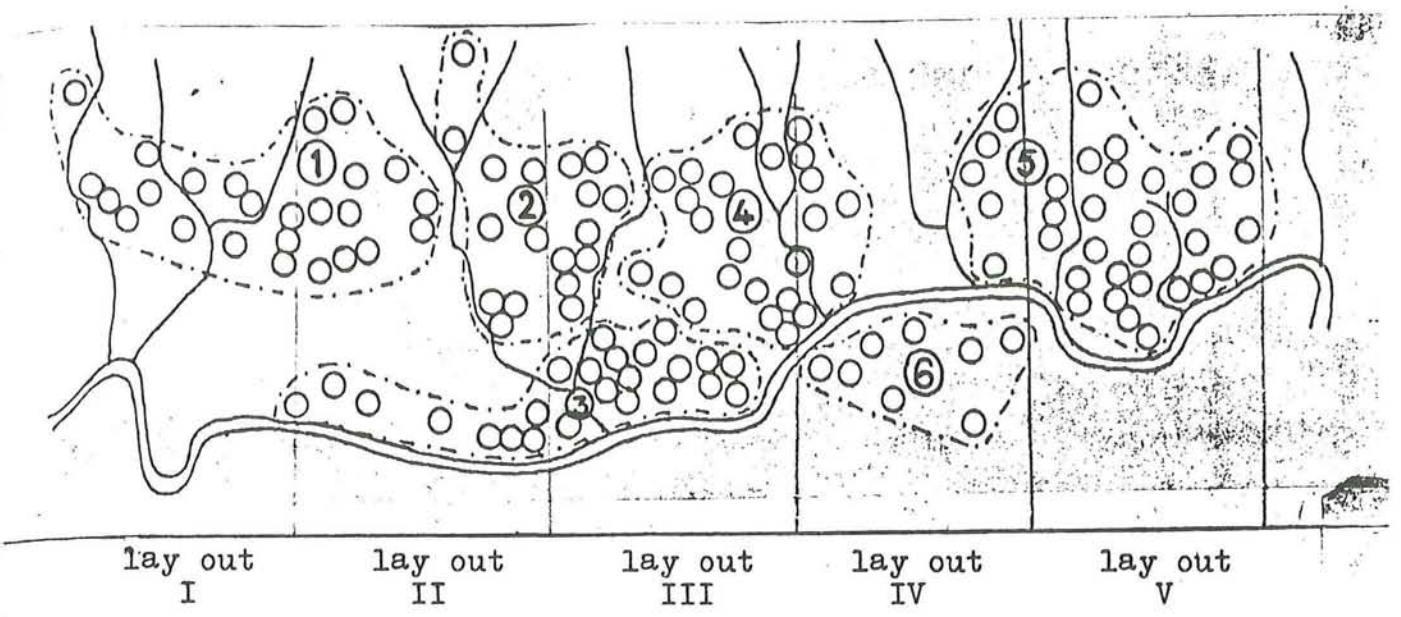
Having indicated relations between the different Basic Need aspects and Village aspects, it would next be suitable to investigate the possibilities for a spatial integration of certain Basic Needs or Basic Facilities that have a priority within the village community.

As revealed in the description of the relations, the implementation of certain facilities will act upon or influence the existing environment, determine the use of the environment for particular activities, and also that the existing environment in turn will determine the conditions for the establishment of different facilities and their integration. Moreover it is so, that some facilities will act upon a small area (for instance, in case of situating a well, latrine, access footpath or vegetable garden), whereas other facilities such as a village access road, internal tracks, a watersupply transport pipe-line or a woodlot will act upon a much wider area.

The aim is to arrive at a better physical environment, inwhich the desired facilities are integrated so as to meet the basic needs of a particular household, a cluster of households, a section of the village or the village community at large to the best possible way.
It is therefore obvious to distinguish and relate different scale-levels in the exercise of designing a better environment inwhich the desired facilities could be integrated.
(Most important to mention is that such exercises should be conducted in close co-operation with the villagers, being the beneficiaries and implementors at the same time)

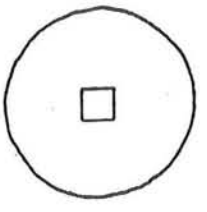
Unable to generate such co-operation, the design exercise was done individually and the result may be regarded as a top-down suggestion, but nevertheless a realistic alternative to present.

Two design-scales have been made use of, namely village scale-level and neighbourhood scale-level.
Spatial design indications are represented and clarified in sub chapter 6.1. at village scale-level, and in sub chapter 6.2. at neighbourhood scale level.
In seeking to design an integration of the Basic Needs/Facilities Roads, Sanitation, Housing, Energy, Homegardening and Watersupply, the options for wells and tapped water have been seperately worked out at both the scale-levels.

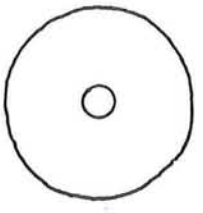


Indications

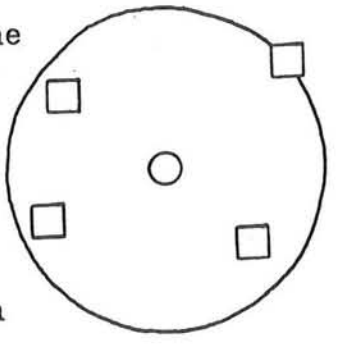
- House
- Sarvodaya member
- Possible well site
- Existing well site
- Possible bathing place
- Existing bathing place
- Possible tap site
- Existing tap site
- Existing spring site
- Possibility for latrine construction
- Existence of suitable latrine
- Culvert
- Forest stream
- Major transit footpath
- Forest line
- Major track



Area of distance suitability for latrine construction



Watersource protection zone



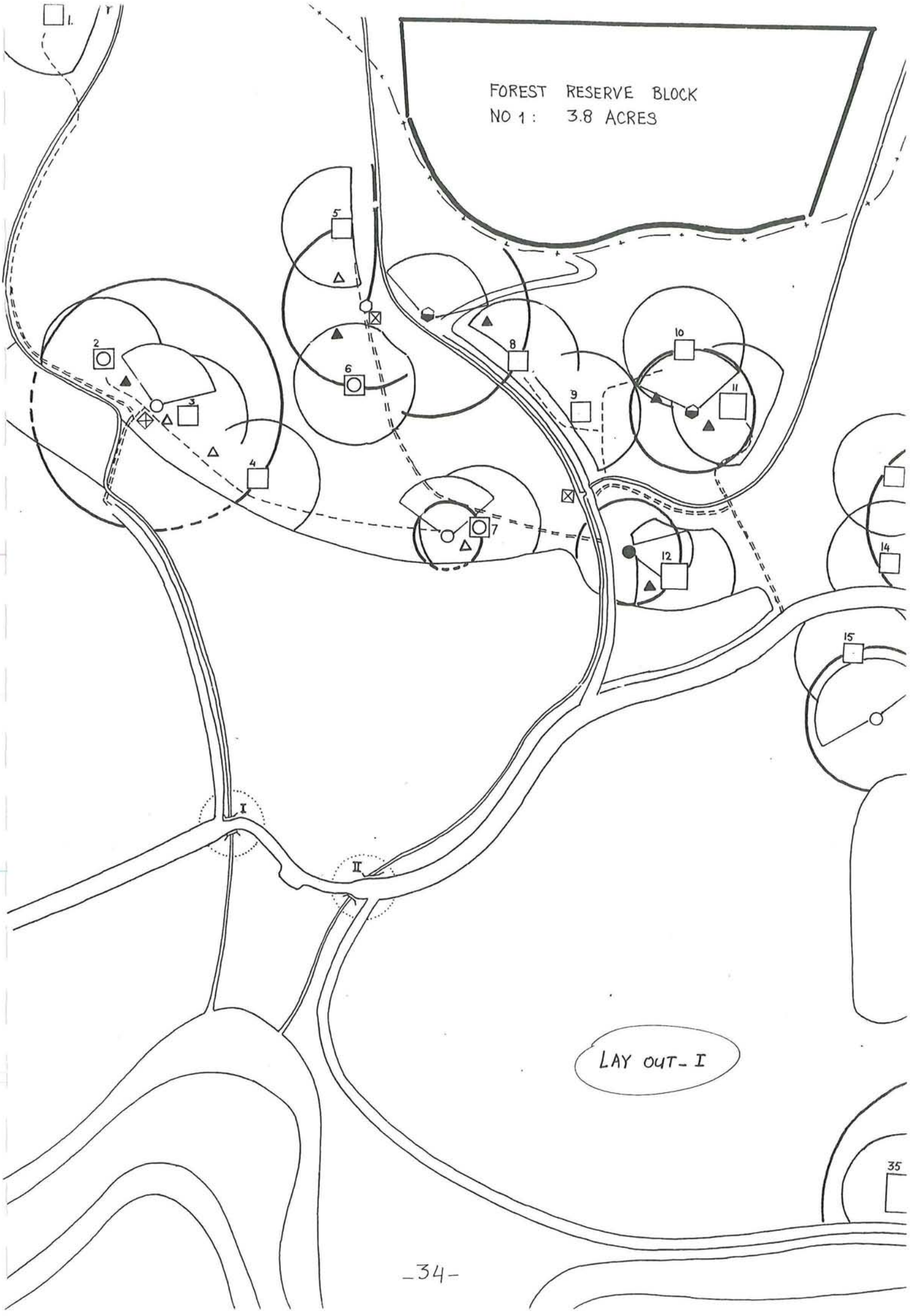
Watersource supply area

6.1. SPATIAL_DESIGN INDICATIONS

AT VILLAGE SCALE-LEVEL

1. OPTION FOR WELLS
2. OPTION FOR TAPS
3. CLARIFICATIONS

1. OPTION FOR WELLS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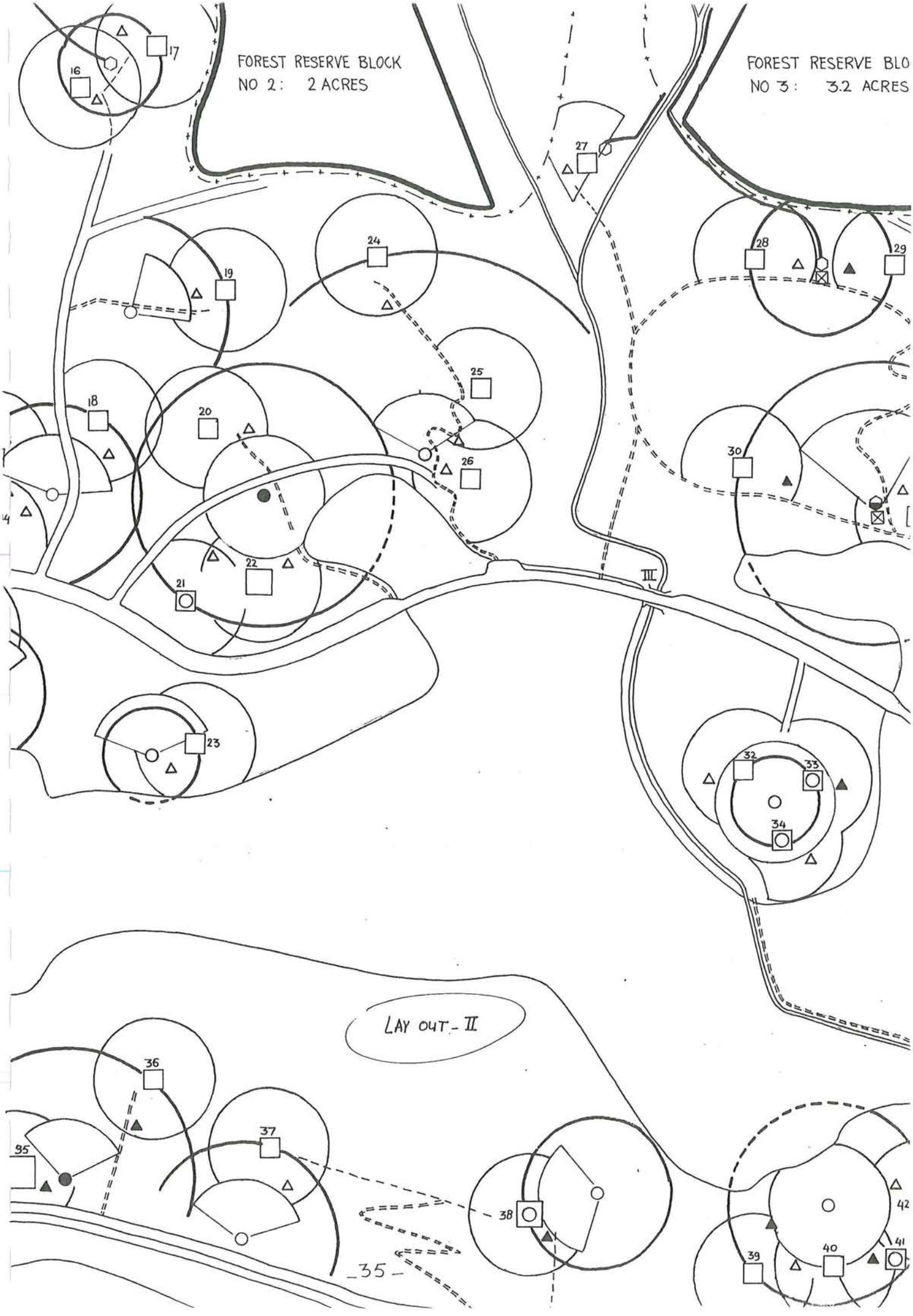
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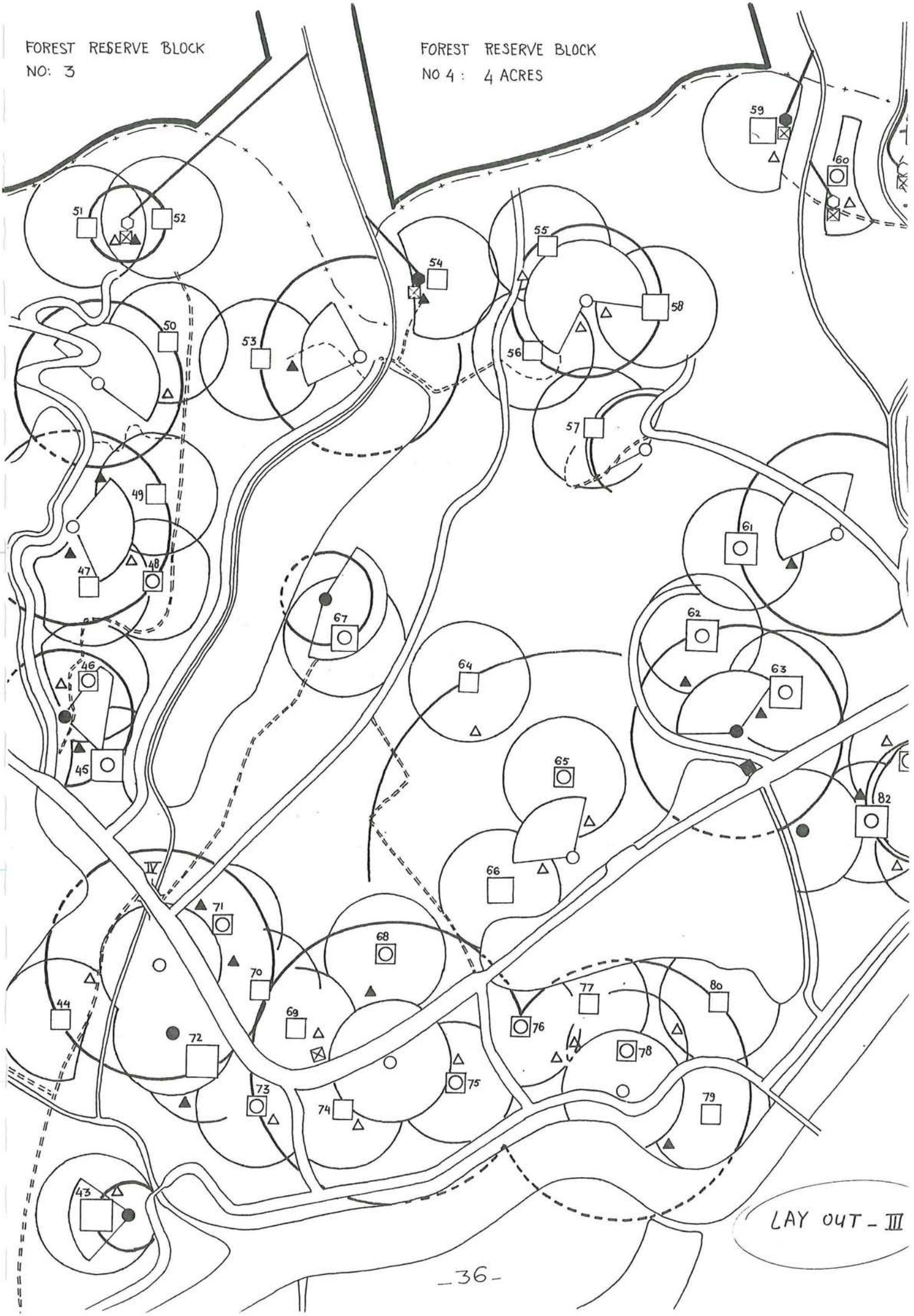
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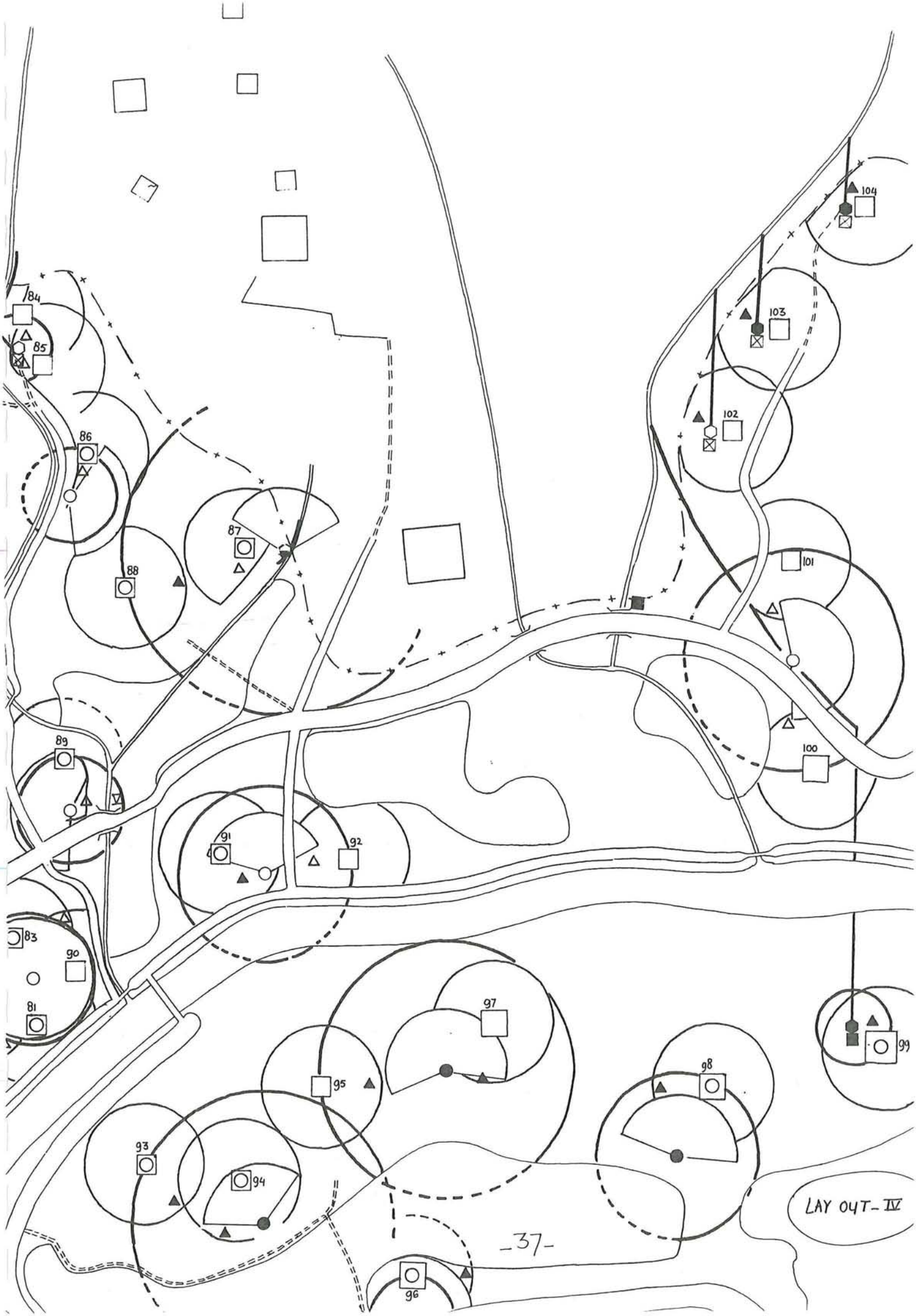
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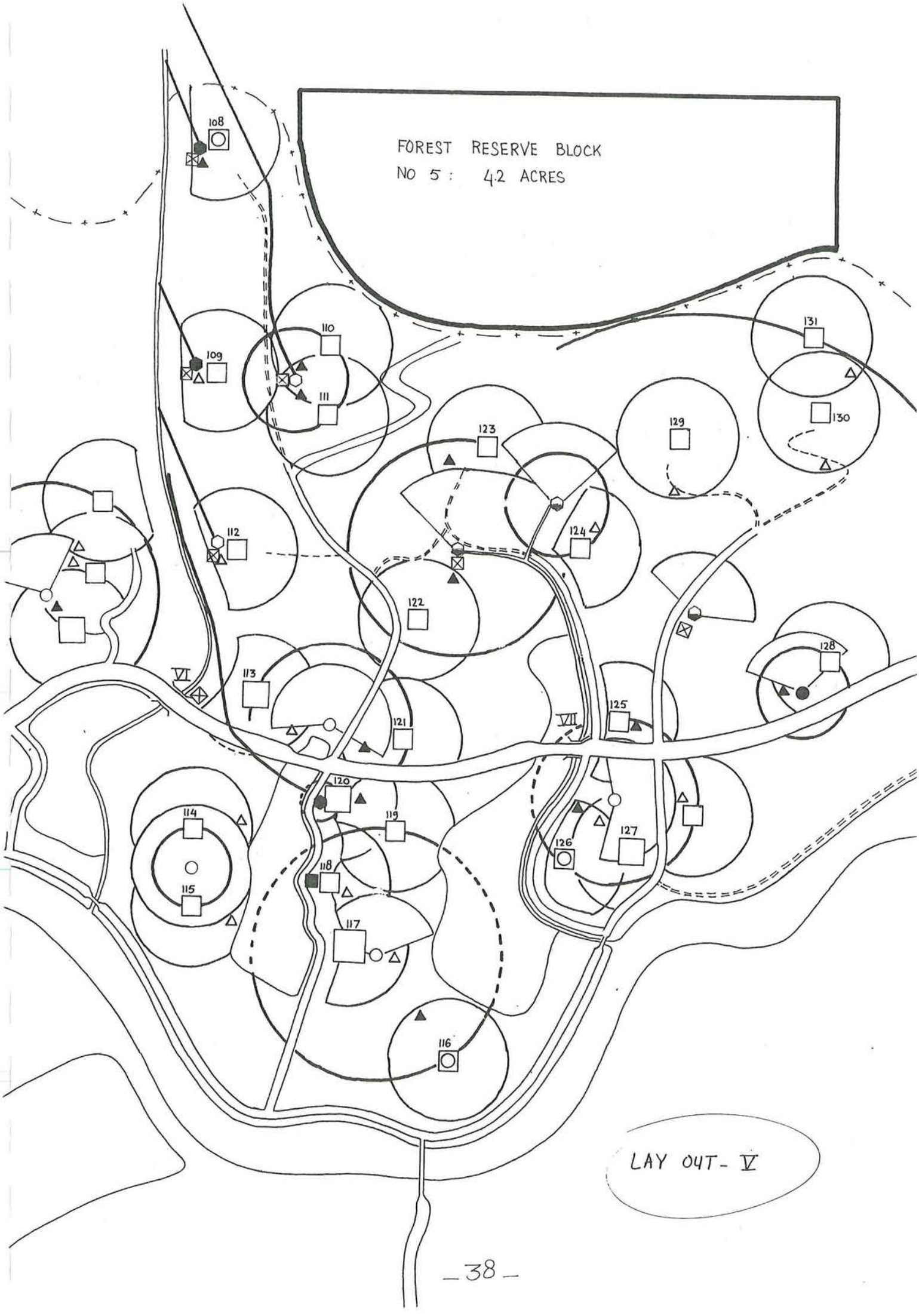
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LAY OUT- V

2. OPTION FOR TAPS

Legend ?

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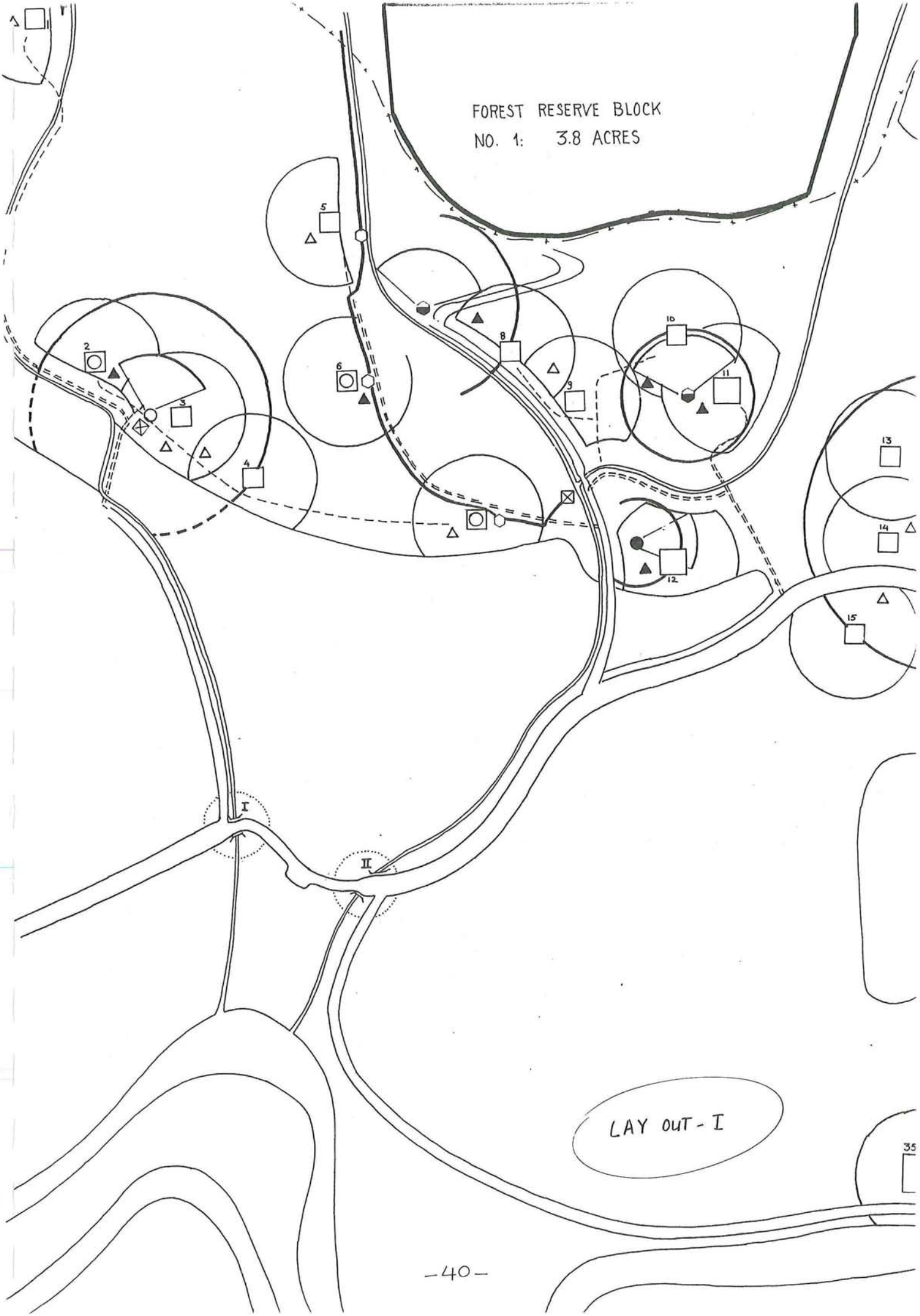
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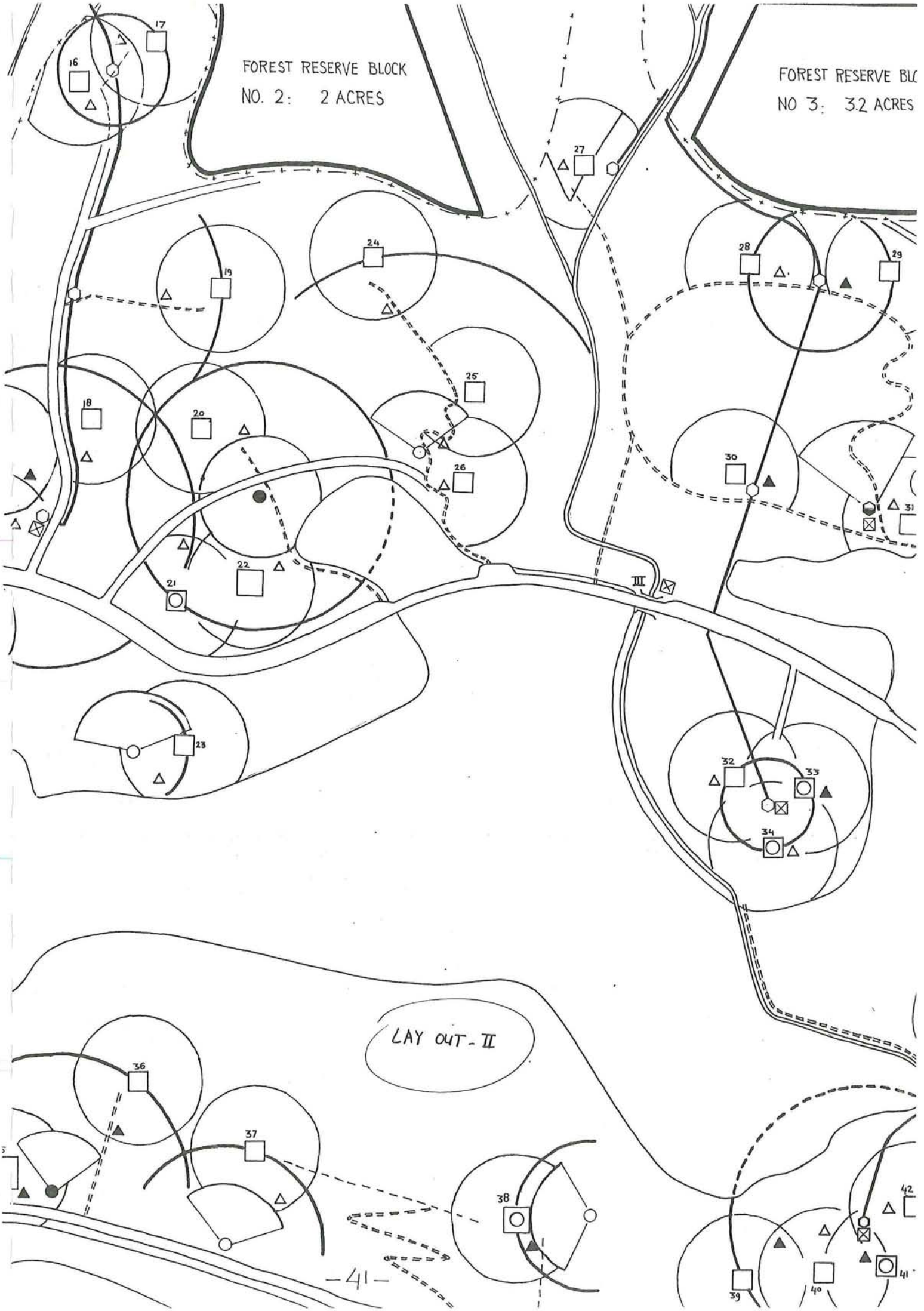
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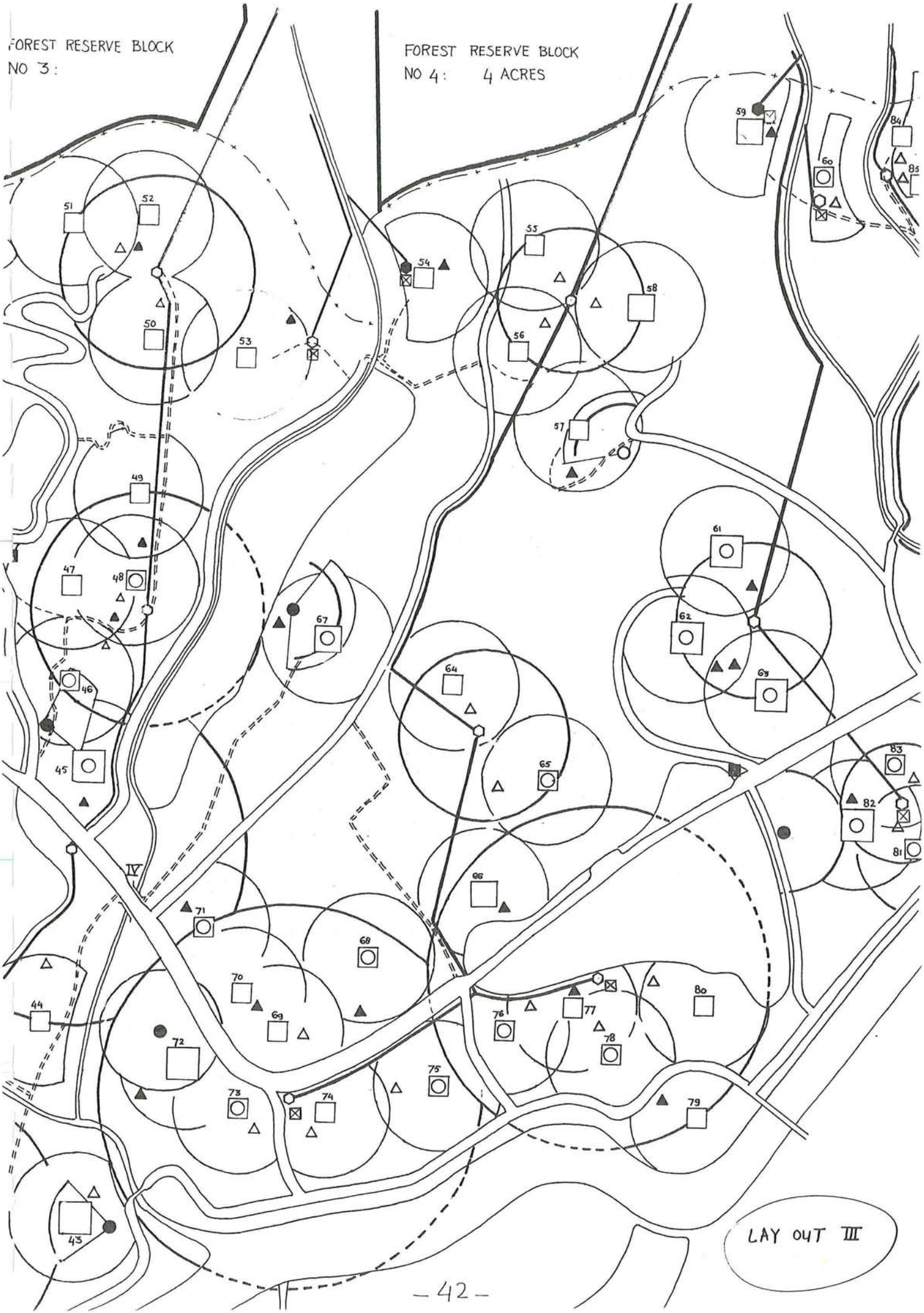
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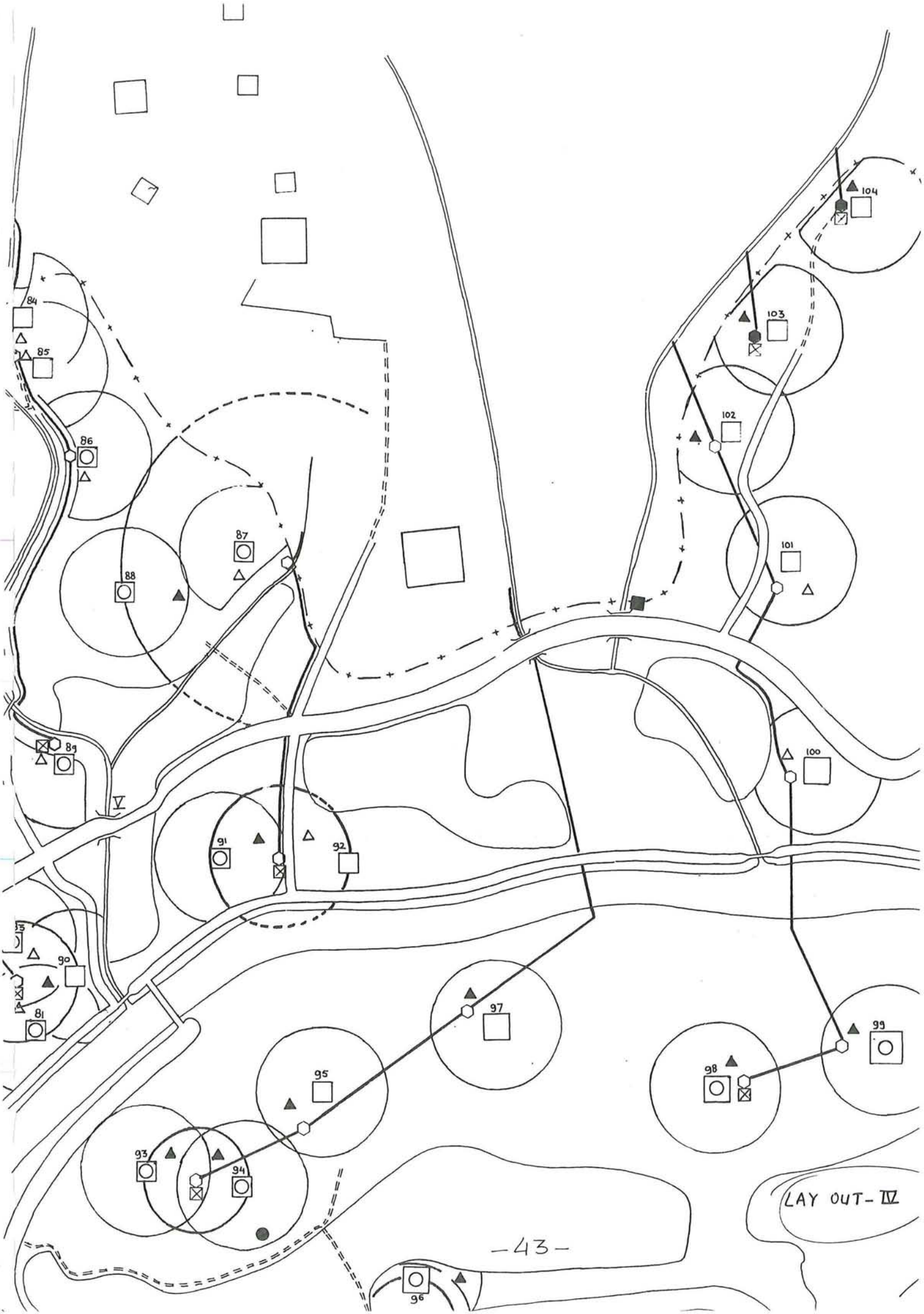
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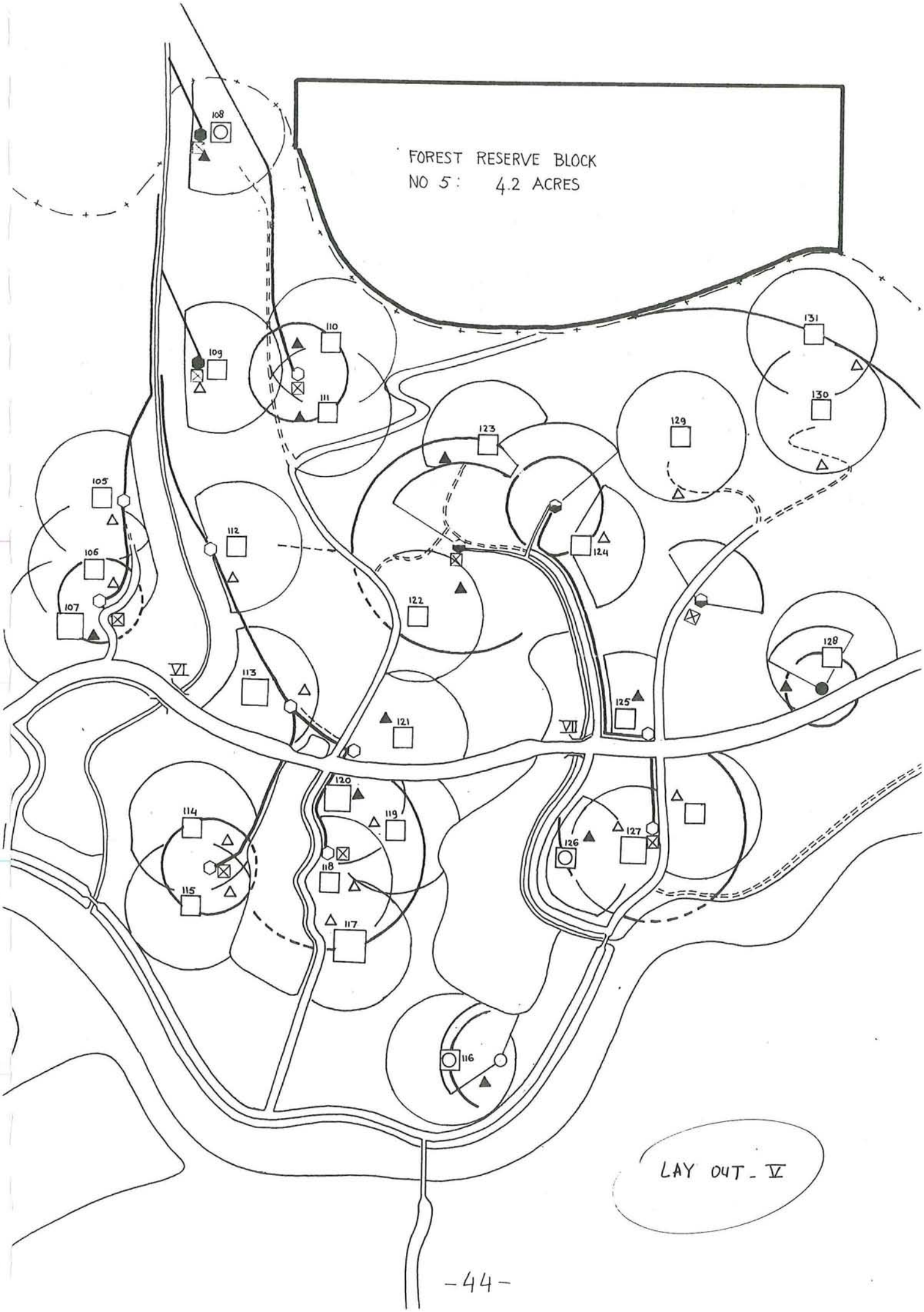
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3. CLARIFICATIONS

Water:
Priority may be given to a supply of sufficient and safe drinking water available within a reasonable distance from the house //Rel:(01-02,09;02-24,25). This assumption is justified, as it was found that 45% of the households are using drinking water of a suspicious quality.

Based on the natural appearance of water two obvious options have been worked out:

- Supply of (drinking) water through simple protected community wells, making little use of the possibility for tapped stream water, and
- Supply of (drinking) water through tapped stream water where possible, making little use of wells.

The first option proposes the construction of simple well-protection measures as indicated in the Graduation Report (chapter XI-10,11) using local available materials.
None or little finance for the use of cement is required. For the majority of households being poor the most obvious and acceptable solution.
Construction costs may contribute to a maximum of Rs Rs. 500 per well, hence the priority is given for the lay out of community wells so as to allow greater quality construction and reduce the financial contribution per household user.

In those areas where wells can not be constructed // Rel:(39-05,12)// tapped water is still considered. It is further expected that a continued use can be made of the already existing spring sites.

Coming from?

The rather simple constructed protection measures imply that certain restrictions will have to be placed on the use of the spatial environment within the immediate vicinity of the well or spring site, so as to protect the source waterquality from becoming polluted //Rel:(01-05,11,13,17,24,36,39).
The selecting of latrine sites is in this respect of particular importance.
It is therefore that water source protection zones with a radius of 20-25 mtrs have been indicated.

Well-sites have been projected on the most obvious places, where ground water is expected to be found not too deep, for most cases within 50 mtrs to groups of clustered houses //Rel:(02-05;05-24,25,30,41).
Site selection of new wells is furthermore influenced by considerations for the provision of suitable footpath access since water has to be carried //Rel:(05-22; 22-38).
Some footpaths may already exist and be part of an internal footpath access structure //Rel:(22-22,24,25), but new footpaths may also have to be constructed.

Though more costly, the second option for greater use of tapped stream water has also advantages.
Provided that inlet conditions are secured and the transport system is well functioning there will be a constant supply of reliable quality water which can be tapped conveniently.
There is greater freedom in fitting taps within close distance to clustered or even single houses along the main transport line //Rel:(06-15,25).
Less restrictions need to be placed on the use of the space around the tap and latrines can thus be situated closer to it. Facilities for bathing and washing can be additionally constructed.

? Poly-ethene !!

For short lengths of open water transport upto about 50 mtrs local bamboo can be appropiately made use of, but for greater lengths it is more suitable to use closed systems of pvc pipes or rubber tubes (Costs approximately Rs. 15 per meter, taps included).
A suitable tracing of these transport systems and the provision of other constructive precautions will contribute to better secure the prevention from damage of the system //Rel:(06-20,22,33,35,36,37,40).

Sanitation:
The fact that 57% of the households do not use a proper sanitary facility compels to carry on Health Education Programmes, preceding the start of a Latrine Construction Programme in the village.

Already has been mentioned that latrine pits possibly can effect the quality of natural water sources and that therefore protection zones should be observed where no latrines are to be situated to prevent unnecessary pollution of the source.
Latrines should nevertheless be situated in the vicinity of the house and within a reasonable distance from a water source to obtain water for cleaning and in the case of water-sealed latrines also for flushing //Rel:(17-24, 26,27).
Assuming that latrines are preferred to be situated within 25 mtrs from the house, than it will be possible to indicate areas of distance-suitability around each house. Since it may be expected that latrines can be found in these areas a confrontation with the water-source protection zones will be directive for the suitable selection of water source sites at village scale level and thus influence the lay out of the main watersupply structure.

As for water sources, latrines have also to be made accessible by footpaths //Rel:(17-22).

//Rel:(17-38), the type of disposal system //Rel:(17-26, ,

This aspect in connection with local terrain conditions //Rel:(17-38), the type of disposal system used //Rel:(18-24), considerations of privacy //Rel:(17-26,27,41) in relation to a definite selection of latrine sites has to be looked into at the particular neighbourhood scale level.

Roads:

The planned Shramadana road, forwhich the first two culverts in the Northern sector have been constructed recently, would make the village accessible for motorable traffic.

The construction of a motorable bridge over the Neluwa river, which separates the village from the main road, can not be expected, at least not in the near future, and hence not considered optional in the determination of the village access structure //Rel:(20-21).

In the Graduation Report, three options for alternative tracees have been examined in Chapter XIII-4,5 and the trace which was selected by the Shramadana Society meeting has been described and illustrated amply in XIII-7,8.

'Access Road' as element in the Relation Scheme is therefor not treated as a variable theme aspect, but as fixed element and spatial defined.

In the spatial lay out the access road has been projected where the Society had marked it; through the middle of the village.

The motorable access road will open up possibilities for the construction of an internal minor track system passable for at least bicycles, carts and even small three wheel tractors for improved internal accessibility, including the more peripherial village areas as well // Rel:(20-20).

An obvious lay out for this internal track structure has been indicated.

Most of these tracks have been projected over already existing transit footpaths which will have to be widened up.
In providing access to the more peripherial village areas their orientation is mainly East-West and they connect on to the motorable access road at periodical intervals.
Thus is avoided that streams, which emerge from the Forest, have to be crossed forwhich bridges must be constructed.

Apart from those leading to the higher elevations in the East, most of the tracks can be easily lined flat, which is convenient for transport and reduce damage through rain water erosion and thus the need for constant maintenance.//Rel:(20-38).

Together with the settlement pattern of the houses, this internal track system will form the Super-structure at village scale-level for the lay out of the footpath infrastructure and other facilities at the neighbourhood scale-level //Rel:(22-05,06,17,24,25).

Housing:
As above mentioned, existing houses are considered part of a Spatial Super-structure both at village and at neighbourhood scale level.
It is therefore, that the selected physical aspects on Housing listed in the Relation Scheme are being treated with as spatial fixed elements.

However it will be so that more houses will be built by young families in future and thus new housing sites will bring about a change in the Spatial Super-structure, especially there where new sites will be selected on bare lands and uncultivated communal grounds.

But an already existing infrastructure as well as one that is expected to be created, including facilities such as watersupply, tracks and footpaths, is also likely to determine the selection of new housing sites.

It may be obvious to assume that in future more houses will be built on bare lands and uncultivated communal grounds close along the access road and along some of the minor tracks, where watersupply facilities are already available or can be made available easily //Rel:(24-5, 20,22').
Obvious areas for these new housing sites can be indicated in the Spatial Design.

Food-homegardening:
To attain greater self-sufficiency in food production through vegetable gardening is one of the development activities that are promoted through the Sarvodaya pre-school programme.

Vegetable gardening for home consumption and even for local market production for some income generation will rather remain a domestic activity that will be restricted to take place within the compound in the vicinity of the house.
Possible sites for vegetable beds are hence addressed at the neighbourhood scale level.

Energy-fuel:
Next to the planting out of trees within individual compounds and the interplanting of ipilipile in tea field plots, the reservation of Forest Fuel Blocks is suggested to attain village self-sufficiency fuel and timber wood consumption //Rel:(32-27,31,37;33-31,34).

The planting of small woodlots on certain centrally located bare lands in the village may be considered, but it is more likely that these lands will be claimed in future for the building of home-steads and tea cultivation by small holders and landless families.

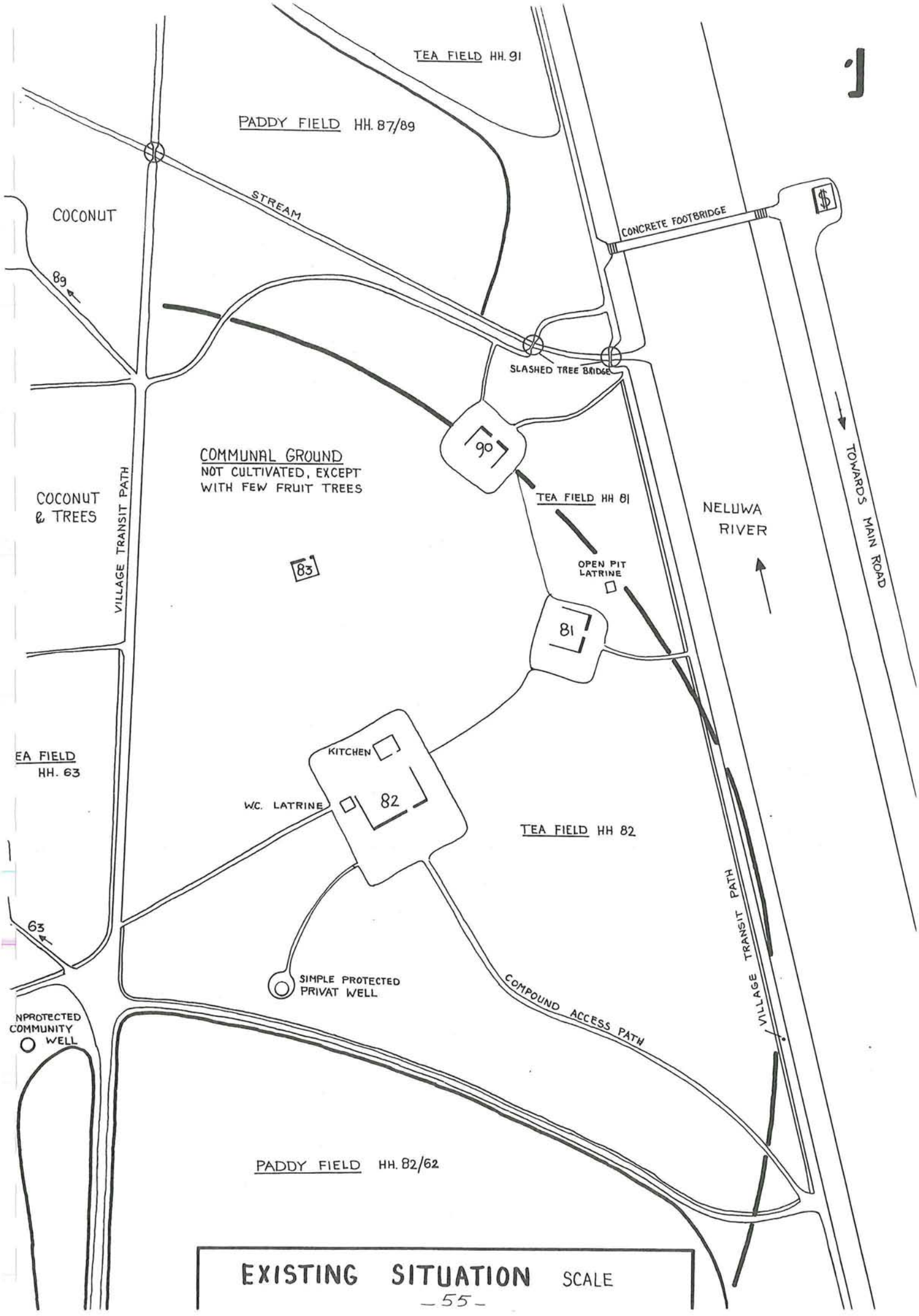
The best possible locations for the Forest Blocks have been demarcated as well as how they have been made accessible by tracks to allow the transport of wood and planting materials.

6.2. SPATIAL-DESIGN INDICATIONS

AT NEIGHBOURHOOD SCALE-LEVEL

1. AN EXISTING NEIGHBOURHOOD
2. OPTION FOR WELLS
3. OPTION FOR TAPS
4. CLARIFICATIONS

1. AN EXISTING NEIGHBOURHOOD



EXISTING SITUATION SCALE

Description existing neighbourhood situation

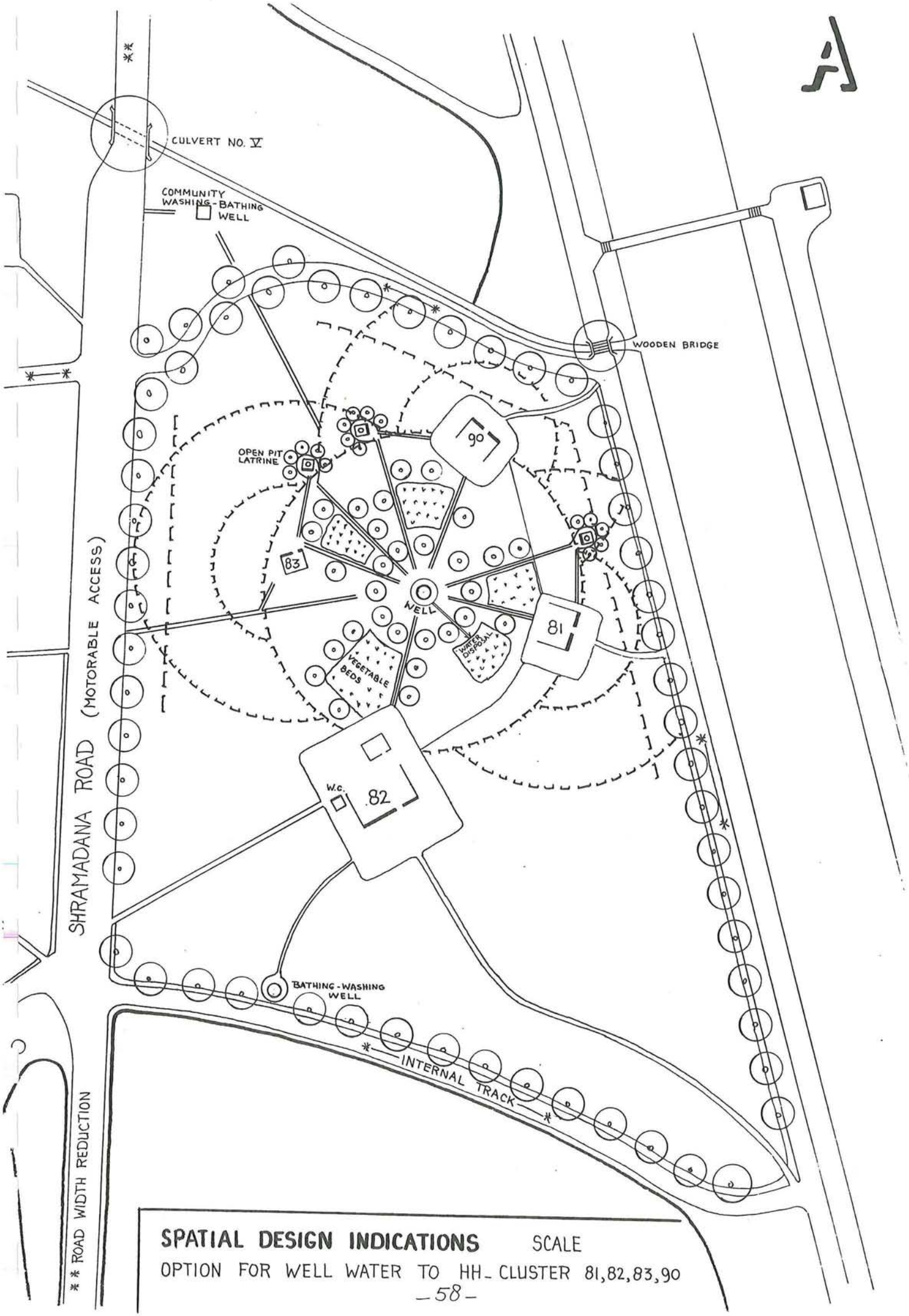
Within the village, different neighbourhoods can be selected and their internal lay out could be worked out with the residents in alternative ways, based on the indicated greater Super-structure.

For the purpose of this study-paper only one neighbourhood is selected as an example.

It is located in the middle of the village in Village Sector IV along the Neluwa river on flat land.
The neighbourhood comprises of a cluster of 4 houses, no. 81,82,83 and 90.
Tea and paddy cultivated properties are indicated. The central part belongs to communal grounds and is not cultivated except with some scattered fruit trees.

Household 82 stands out in wealth, with property of paddy and tea, a good stone house, a water-sealed latrine and protected well for private use. The well is however situated rather close to the paddy field and the water quality can be effected.
The other three households obtain water from an unprotected shallow well very near the same paddy field of which the water is certainly not reliable. This well is used by many more households in the surrounding areas.
The open pit latrine of household 81 is in bad shape and abandoned, instead the River is made use of, so do the households 83 and 90.
The area is surrounded by footpaths of small width from which the houses can be reached; a clear internal footpath structure is not really present.
Where transit footpaths cross the stream, short trees are lashed for passage.

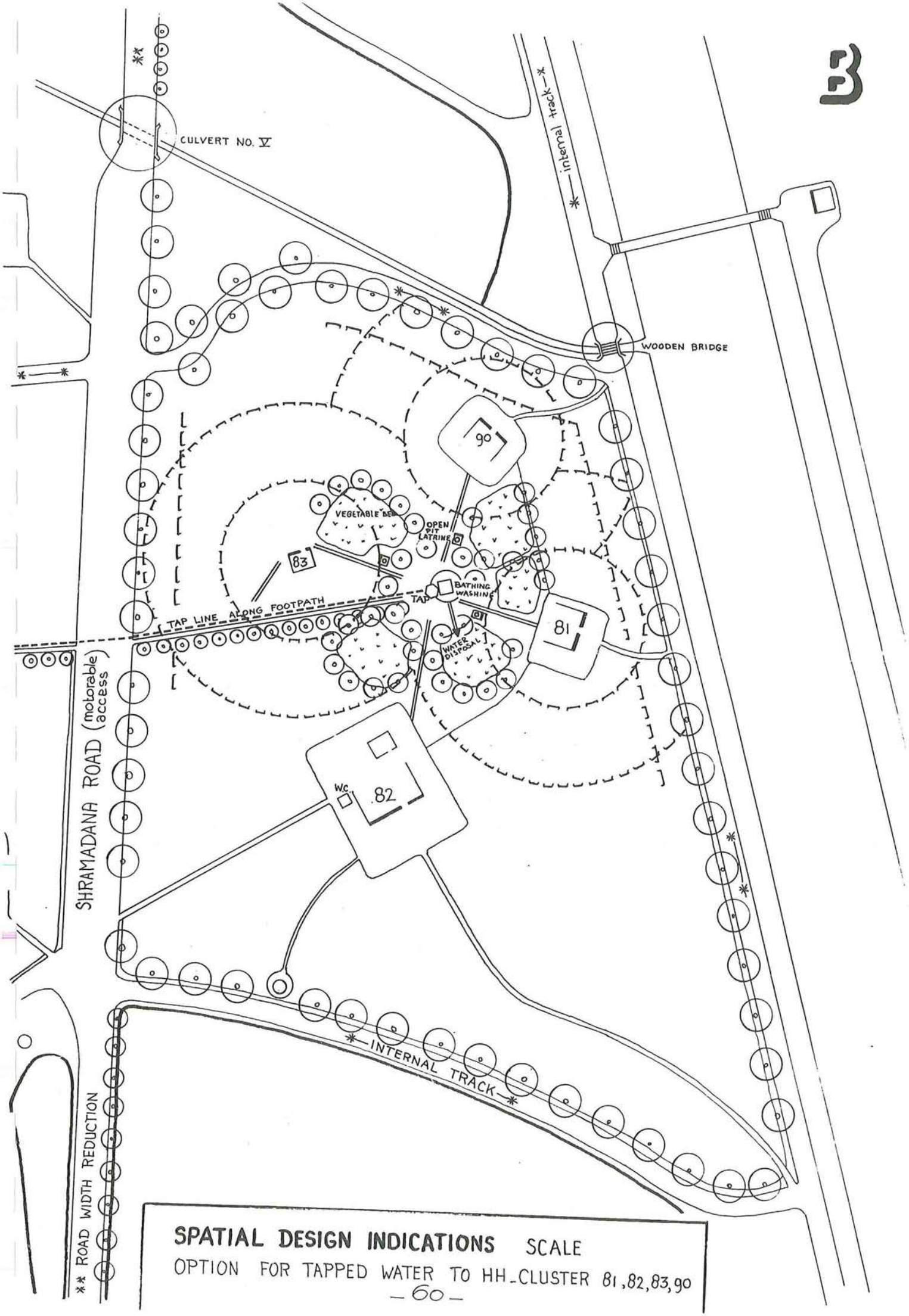
2. OPTION FOR WELLS



SPATIAL DESIGN INDICATIONS SCALE

OPTION FOR WELL WATER TO HH - CLUSTER 81,82,83,90

3. OPTION FOR TAPS



SPATIAL DESIGN INDICATIONS SCALE

OPTION FOR TAPPED WATER TO HH-CLUSTER 81, 82, 83, 90

4. CLARIFICATIONS

Option for wells:
In the centre of the cluster a well has been projected //Rel:(05-25).
Around the well a protection zone of about 20 mtrs in radius is to be observed, and distance-suitability areas for open pit latrines, extending within the radii of 10 and 20 mtrs around the houses, are indicated.
Within each of these areas, outside the watersource protection zone and for reasons of privacy away from public paths, the latrines can be situated Rel:(17-24,05,20,24).

The well and latrines have been made accessible from the houses through an internal footpath structure which is triangular Rel:(22-05,17,24).
In between, vegetable beds could be situated and trees planted to provide for shade Rel:(28-05,22,27,32).

The surrounding footpaths have been widened up into minor tracks passable for bicycles and carts and they connect to the Shramadana Access Road which will go along the cluster to the East.
The Access Road is projected to its full design-width, but this is reduced to the North and South since paddy fields will be crossed here.

Many trees could be planted along the minor tracks and the Access Road to provide for shade //Rel:(32-20)
Also in the tea plots and elsewhere within the cluster more trees can be planted for use as fuel and timber by the households //Rel:(32-27,37).

Since the well will be simple protected, it is important that the well site will not be used for bathing and washing; hence such a facility is projected as a shallow well for community use to the North along the Access Road.

but 1 well

Abstehung 2 wells

Option for taps:
Alike the well, a tap is also projected central in the cluster //Rel:(05-25).
But since in this case there is no protection zone to be observed, latrines and even facilities for bathing and washing could be situated close to the tap site.
The distance-suitability areas for open pit latrines and privacy zones along public paths remain unchanged.

As these facilities can be concentrated within the centre of the cluster, they can be easily made accessible by radial traced footpaths, starting from the houses.
The latrines are likely situated directly on to these footpaths.//Rel:(22-05,17,24).
The tap line which enters the neighbourhood from the East has been traced parallel to a cluster access path which connects on to the Shramadana Access Road //Rel: (22-06,25).

Possibilities for the site selection of vegetable beds and the planting of trees remain the same as for the well option //Rel:(32-20,27,37).

IN REPLY TO THE COMMENTS ON MY STUDY REPORT

Comment: An integration/a connection between the various research themes towards Plan formulation is missing.

Reply: This is true. I have not arrived to use the research findings of the themes for drawing up a final detailed development Plan.

As indicated in the work-plan earlier, my expectation was to come at least with a Village Development Plan for Bogahatota village, from the assumption that I was going to involve members of the Shramadana Society in the planning process, (starting point/bottom-up approach).

Unfortunately upon my arrival in starting the research this Society had become defunct, the reason forwhich the explanation is given in Chapter 13/4&6.

X Still hopefully to restore its function as a people's participatory forum in due time I intervened to bring the protracted road-failure-issue closer to a resolution, but despite the functioning of the Society remained in a dead-lock.

Even the only voluntairy support of 2 village youth assisting the base-line research was toppled by the village head-monk after one month.

Together with my interpretor we had become the sole researchers and under these circumstances unable to involve groups of people in research, in evaluating findings, in prioritizing and activity planning for self-implementation. This I have experienced as a great handicap, but

I did not want to draw up a Plan for the Bogahatota 'community' by myself without their involvement, since I think it would not be realistic and of no use.
Hence I have meant to suffice with working out the various Basic Need Research themes as separate parts without seeking to integrate them into a coherent Plan for Bogahatota village.

Comment: To what extent does the Sarvodaya Movement co-operate with the Government of Sri Lanka?

Reply: The Sarvodaya Movement originated in 1958 and has grown ever since, working at the moment in some 8000 villages out of a total of 25000.
(Under the NOVIB-CIDA-Sarvodaya partnership funding is provided for 5600 selected villages, linked to 1120 Gramadana Units, 280 Divisional Centres in 31 Districts)
Some 3000 full-time volunteers are employed with Sarvodaya. The real figure is not known, but some 2 million rural people out of a total of 15 million may be involved regurlarly in Sarvodaya activities in one way or the other.
One may say a state within a state, a big people's power growing bigger all the time, with which any Government in power has to take consideration

One of the long term goals of the Sarvodaya Movement is to change the existing social order and replace it with a Sarvodaya social order(see also Chapter 3: educational chart).
Sarvodaya is definitely not for the promotion of the existing system(free-trade zone,westernalization, capitalistic economy), but being a voluntary organisation Sarvodaya has its own limitations in the process of realising its objectives.
Sarvodaya wants to change society, but in a non-violent revolutionary way.

In his writings Ariyaratne states .....
'that Sarvodaya would not force people to go against any Government, since such action would only be a very short term measure and would not make any permanent change in the system
(I think this is very diplomatic and still true for the moment)
..... what Sarvodaya wants is to educate people sothat they would understand themselves whether the policies of the Government are for their benefit or not.
He further states .....'that Sarvodaya can function in co-operation with any Government which has been elected by the people ..... and that it can give support to any Governmental programme which will really benefit the people ..... However, being a movement which is against any form of power or party politics, Sarvodaya has nothing to do with the political party the Government belongs to.'

At the Sarvodaya HQ's almost nothing is secret and to my knowledge there are no meetings between the Colombo political elite and the Sarvodaya top on policies at the national level.
But Sarvodaya is involved in relief and rehabilitation work in camps in the Northern and Eastern Provinces; it also recruits a community worker to each and every Model Village that is opened up by Prime Minister Premadasa, it organises amity Camps between Tamils and Sinhalese on estates owned by the Government, and it does not work in the Mahaweli settlement schemes.

At the local level the interest of Sarvodaya to make Governmental extension services available to the village people is most visible.
In the various research themes I have also paid attention to tap these services as well as to the functioning of the newly established rural

institutions(the Gramodaya Mandala, Praedeshiya Mandala and District Development Councils) through which the gap between people's organisations at village level and the various Governmental Officers could be bridged(see Chapter 5).

Comment: The distinction made between Community Development(CO) and Community Organisation(CO) is not very clear.

Reply: Why not? When compared both concepts refer to opposite extremes.
These distinctions I have recalled from notes made while attending parts of a training course on development that was conducted for Sarvodaya District Coordinators by trainers from the Institute for Rural Reconstruction(IRR) in the Phillipines.
This Rural Reconstruction Movement pretends to work according to the concept of Community Organisation(CO).
This Movement started in the 50's as well. It works in some hundred villages. Persons of higher education and mainly from urban areas are trained for about 2 years and than placed in a village to help to organise a small target group to be identified(wage labourers, landless farmers, tenants, women, squatters, unemployed village youth).

As can be seen from its analysis and vision of society Sarvodaya tends towards the CO-concept as well, but with regard to its development strategy it clearly bends over to the CD-concept.
Also the critisisms towards the CD-concept hold true for Sarvodaya(See Chapter 2; pages 12&13).

Comment: No mentioning has been made about the Civil War.

Reply: This is true. It is headlining the newspaper for allmost 2½ now without telling the truth. The Tamil guerilla's in the Northern and Eastern Provinces are fighting for a separate homeland, which they will call Eelam.
This armed struggle is however confined to the North and East only and does not take place in the Central and Southern Provences of Sri Lanka. My study area was located in the South.

Tamils living in the North are also referred to as Ceylon Tamils. They have come to Sri Lanka from early times onwards, and some say they have come earlier than the Sinhalese.

In the Central and Southern part of the Island there are also Tamil people living who had been brought by the British from the Indian mainland in the late 18th century to work on the plantations first in the coffee and rubber and later in the tea. These Tamils are referred to as Indian Tamils.

Due to difference in caste, origin, status and geographical setting the Ceylon and Indian Tamils do not mingle. The Eelam struggle is not the struggle of the estate Tamils. For the estate Tamils there is no place in the North even when Eelam would become a reality.

About half of the Tamil estate population, some 150.000, are still stateless and under the Shastri-Bandaranayake Pact these people were supposed to be sent back to Tamil Nadu(South India). Probably since the Sri Lankan Government has been afraid that many of them, once sent back to Tamil Nadu, would become recruited for training in terrorist camps, and would come back as guerilla fighters to infiltrate the estate areas, the expulsion policy has been modified to grant

to grant citizinship to all Indian Tamils.

The estate Tamils do belong to the most exploited groups in Sri Lanka. They provide for most of the nation's wealth, through the export earnings from tea.
In the estate sector the principle of divide and rule is most evident. The estate worker families live scattered in barracks, called line rooms, in groups of 50 to 100 persons, on the fields they have to work.

Especially on the private owned estates their living and working conditions are the worst.
In the Pallimulla GS Division only private estates are to be found and here the Tamil popultion is about 1300 persons divided over 24 line-room settlements(indicated in the map on page ..).
Also in the pheripbery of Bogahatota two line-room settlements are situated.

My idea was to include the Bogahatota Tamils in the research once I had completed my work in the village at the end of my stay in the rea, as I knew that such attention would jeopardize my stay and my functioning as Project Officer for the 10-village Project.
After having simply visited the line-rooms a couple of times to acquaint with the Tamil people I realised that my association with them was not appreciated from many sides.
The situation in Sri Lanka is very tense; not for the sake of the study I wanted to create problems for the Tamils, the Sarvodaya workers and myself, so I abandoned my plan.

Comment: The application of a slow sand filter with regard to the extraction of drinking-water has not been considered.

Reply: I assume that such application is related in the village where stream water is to be used for the purpose of drinking water.

I have not met this application in Sri Lankan villges yet.
Ofcourse it is preferably to secure the quality of stream-water.

- Water diverted from a stream could be led into a concrete tank, filled with sand.
- the water could enter into the tank at the top and be let out at the bottom and thus being filtered by the sand.
- The water-flow capacity should be slow and the storage of filtered water in a second tank should be made possible to cover the drinking water demand of the users.
- Overflow water from the filtertank could be used for the purpose of bathing, washing and cleaning.

I think this could be an effective and rather simple measure.
This system requires well organised maintenance by the users to remove, clean and refill the filtertank.

LITERATURE

1) Anderson, N. - Rural Health/Ideas and Action No. 127

2) Ariyaratne, A.T. - Collected Works Volume I & II Netherlands, 1980
- Development from Below Oxford University 1986
- A struggle to awaken Sarvodaya Press Moratuwa 1980
- Dwellings for Humanity Sarvodaya Press Moratuwa 1985
- Ten Basic Human Needs Sarvodaya Community Education Series

3) Bandarage, A. - Colonialism in Sri Lanka Lake House 1985

4) Chambers, R. - Rural Development, Putting the last first. Longman, New York 1983

5) Consortium on rural technology - Rural Sanitation Delhi 1981

6) Dias, H. - Rural Development Planning Bangkok 1981

7) Evans, I e.a. - Lorena Stoves The AT Projects of Volunteers in Asia 1981

8) Ghai, D.P. - The Basic Need Approach to Development ILO 1980

9) Goulet, D. - Sarvodaya at the Cross Roads Marga Institute Colombo 1981

10) Graig, J.H. - Towards a western version of the Sarvodaya Movement Vishva Lekha Moratuwa 1984

11) Howes, M. - The Sarvodaya Stoves project I.T.D.G. London 1983

12) Kalbermath, J.M. - A Planner's Guide/Appropiate technology for watersupply and sanitation World Bank Washington 1980

13) Kantowski, D. - Sarvodaya the other development Vikas Publishers New Delhi 1980

14) Leitan, G.R.T. - Local Government and Decentralised Administration in Sri Lanka Lake House Colombo

15) Lunt, M.G. - A Survey of Village Housing in Sri Lanka Rural Technology Programme London 1981

16) Macy, Joanna - Dharma and Development Kumarian Press Connecticut 1983

17) Marga Institute - An Analytical Description of Poverty in Sri Lanka Colombo 1982

18) Ministry of Local Government Housing and Construction - Gramodaya Mandala

19) Ministry of Plan Implementation - Matara IRD Report 1985

20) Nanayakkara, V.R. - Administration Report of the conservator of forests Forest Department Colombo 1984

21) Oakley, P. - Approaches to participation in rural development ILO 1980

22) Van der Plas, M. - Basic Needs and Resources Eindhoven TH Department of AT

23) Ponnambalam, S. - Dependent Capitalism in Crisis (The Sri Lankan economy 1948-1980) Lake House Colombo

24) Riedijk, W. - Appropiate Technology for Developping Countries Delft University Press 1982

25) Smillie, I. - Sarvodaya Shramadana Movement an assessment London 1985

26) Statistical Division Matara - Statistical Handbook 1984 & 85 Matara District Kachcheri

27) Tilakaratne, S. - The Animator in Participatory Rural Development W.E.P. Sri Lanka 1985

28) Vita Publication - Village Technology Handbook Mt. Rainier Maryland

29) Waaienberg, H. - The Vegetable Garden in the Tropics Agromiso Wageningen 1981

30) Watt, S.B. - Hand dug wells and their construction Intermediate Technology Publications London 1979

31) Wijewardene, R. - Conservation Farming Department of Agriculture Colombo 1984

32) Wismeyer, H. - Harmony in Diversity University of Cultural Antropology Utrecht 1981

33) de Wilde, T. - Use of Technology in Sri Lanka Sarvodaya Press Moratuwa 1980

34) Wijetunga, W.M.K. - Sri Lanka in Transition

Verantwoording m.b.t. de literatuur vermelding

Het merendeel van de aangehaalde boeken is gelezen om t.a.v de te behandelen theoretiese and praktiese kennis gebieden mogelijkerwijs de eigen kennis verder te verdiepen.
Voor wat betreft het verkrijgen van meer inzicht in de problematiek van onderontwikkeling van Derde Wereld Landen en in ontwikkelings theorieen hebben een aantal boeken daar zeker toe bijgedragen.

De onderzoeks studie evenwel heeft zich, niet in het minst uit persoonlijke voorkeur en door betrokkenheid in het veld, meer gericht op de locale praktijk en realiteit van de dorps samenleving, en veel minder op theoretiese beschouwingen en bewerkingen van door anderen geproduceerde inzichten op dit gebied; ware het voorhanden.
Er zijn zonder twijfel in het verleden in ontwikkelings-landen meer studies verricht en projecten uitgevoerd in de urbane dan in de rurale gebieden; ook door civielen, de antropologen en agriculturists uitgezonderd.
Er is derhalve nog steeds weinig literatuur beschikbaar over de rurale samenleving en haar technology.
Wat ik ben tegengekomen aan toepassingen was veelal te idealisties, urbane import, te geavanceerd, etc.; in ieder geval niet voldoende ontwikkeld vanuit en betrokken op de technologiese realiteit binnen de dorps samenleving.
Het is waar dat er betrekkelijk weinig literatuur op het gebied van techniek in de rurale samenleving in het Engels in Sri Lanka beschikbaar is, en de Marga Institute en Sarvodaya bibliotheek zijn nagenoeg de enige mij bekende toevluchts-oorden.

Van de boeken die ik kon raadplegen in verband met de gekozen onderzoek thema's, heb ik eigenlijk meer geleerd hoe het niet moest, of eigenlijk, hoe het anders en vooral eenvoudiger zou kunnen.

En het is zeer zeker waar, dat er hier in Sri Lanka en waarschijnlijk ook elders in Ontwikkelings landen meer techniese kennis en ervaring onder de mensen is dan dan dat daarvan schrift op papier is.
Dat zulke praktiese kennis, waar die nog bestaat, activering behoeft en waar die teloor is gegaan re-activering, was destijds al een grondgedachte.
Dit was een belangrijke bron voor de ontwikkeling van ideeen by de behandeling en het opschrijven van de verschillende onderzoek thema's.

Literatuur verwerking:

Hfdst. 2. Trend in planned-change development/theories
- de meeste zienswijzen in dit hoofdstuk zijn uitgewerkte aantekeningen, opgemaakt van een 4-weekse cursus over Rural Development voor Sarvodaya District Coordinatoren, gegeven door het Philipines Institute for Rural Reconstruction. Ik heb deze cursus deels gevolgd, en de aantekeningen naderhand verwerkt met uittreksels uit het boek no. 6) Dias H. Rural Development Planning en Training Manual, Bangkok 1981 en 1985.

Hfdst. 3. Sarvodaya Shramadana Movement of Sri Lanka
- een onverkort weergegeven uittreksel van het Sarvodaya pamflet 'Development from Below' door AT Ariyaratne, no. 2)

Hfdst. 4.1. Country data
- Statistical Year Handbook, Department of Census and Statistics en uit Sri Lanka in Transition, Wijetunga, W.M.K. no. 34)

Hfdst. 4.2. Macro socio-economic developments in SL since independence.
- een samenvatting van uittreksels uit no 23) Dependent Capitalism in Crisis, The SL economy 1948-1980, Ponnambalam S., Lake House Colombo.

Hfdst. 5. New administrative framework for participatory planning.
- hoofdzakelijk opgemaakt uit interviews met locale District overheden en aangevuld met no 14) Local Government and Decentralised Administration in SL, Lake House Colombo en met no 18) Gramodaya Mandala Booklet, Ministry of Local Government Housing and Construction Colombo.

Hfdst. 6. Decentralised Network of Sarvodaya Service Centres.
- uit werk-praktijk ervaring met Sarvodaya

Hfdst. 7. The Village Development Plan
- eigen visie

Hfdst. 8. Coordination Network
- aanpassing van een bestaande chart uit een Sarvodaya Service Report, 1985

Hfdst. 9 Bogahatota Village - some introductions
- uit eigen verricht lokaal onderzoek

Hfdst. 10. Pallimulla G.S. Division - some introductions
- uit eigen verricht lokaal onderzoek

Hfdst. 11. (Drinking) Water
- uit eigen verricht lokaal onderzoek

Hfdst. 12. Sanitation
- uit eigen verricht lokaal onderzoek

Hfdst. 13. Roads
- uit eigen verricht lokaal onderzoek

Hfdst. 14. Housing
- uit eigen verricht lokaal onderzoek

Hfdst. 15. Energy-fuel

- uit eigen verricht lokaal onderzoek
  De berekenings methoden via het Forest Department, Colombo.

Hfdst. 16. Food-homegardening

- uit eigen verricht lokaal onderzoek, deels in samenwerking met Martin Beek, een Wageningse student, die op mijn uitnodiging 2 mnd prakties werk heeft verricht in het Project gebied.

Hfdst. 17. Livelihood

- uit eigen verricht lokaal onderzoek

Thomas Pieters
Sri Lanka.