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UNITED NATION DEVELOPMENT PROGRAM (UNDP)

SOUTHERN ZONE KANDAHAR

ENGINEERING DEPARTMENT

PROJECT NAME: KARIZ SALIM RAIN WATER STORAGE SOIL DAM PROJECT

DAM-1 LENGTH=200 METERS.

TYPE OF PROJECT: RAIN WATER STORAGE DAM TO RAISE UNDER GROUND WATER TABLE
AND REDUCE FLOOD DISASTERS

VILLAGE: KARIZ SALIM

DISTRICT: ZERAI

PROVINCE: KANDAHAR, AFGHANISTAN

DATE: MAY - 2022

KANDAHAR-AFGHANISTAN

SHEET INDEX

SOIL STORAGE DAM DESIGN AND DRAWINGS

[illegible]








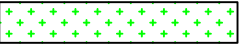

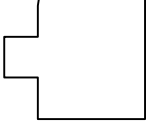
PROJECT INFORMATION TABLES

NOTES:

- 1- ALL DIMENSION ARE BY METER .
- 2- EXISTING SURFACE IS SEEM SAND WITH SMALL LARGE SIZE AGGREGATE.
- 3- All BENCHMARKS ARE MARKED ON SITE AND SHOWN IN PLANS.
- 4- ALL ELEVATIONS SHOULD ADJUST BEFORE STARTING PHYSICAL WORKS.

GENERAL INFO:

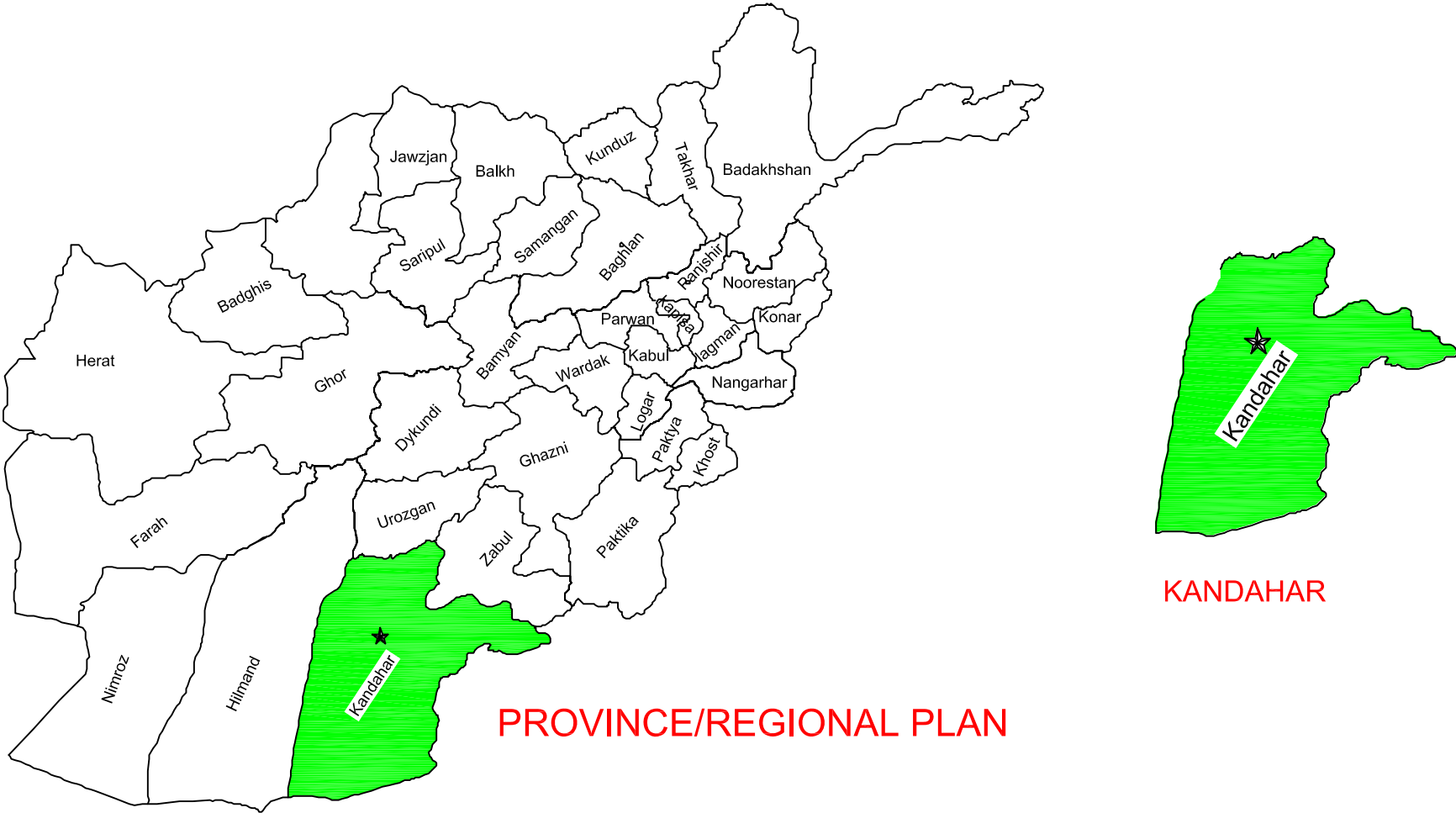
- 1. TOTAL LENGTH OF DAM 200 METERS .
- 2. ELEVATION AND HEIGHT OF BOTH STORAGE DAM IS SHOWN IN DRAWINGS AND WILL ADJUST BASED O SITE GEOGRAPHICAL CONDITIONS
- 3. TOTAL CATCHMENTS AREA 9.83 KM2
- 4. THIS STORAGE DAM HAVE APPROXIMATELY 708750 CUBIC METERS STORAGE CAPACITY.
- 5. ELEVATIONS SHOULD ADJUST AND MARK DURING PROJECT LAYOUT
- 6. BOTH DAMS SHOULD ADJUST FROM BM'S DURING PROJECT IMPLEMENTATIONS
- 7. THERE ARE TWO STORAGE DAM S IN TOW DIFFERENT LOCATIONS.
- 8. THIS PROJECT WILL COMPLETE IN FOUR DIFFERENT PHASES.
- 9. THE FIRST PHASES OF THIS PROJECT TWO DAMS FROM LOCAL MATERIALS.
- 10. THE SECOND PHASE WILL BY FLOOD DIVERSION WALL TO DIRECT WATER TO STORAGE AREA IN BOTH EASTERN AND WESTERN SIDES.
- 11. THE MAIN GOAL OF THIS PROJECTS IS TO RECHARGE UNDER GROUND WATER
- 12. LOCAL RESIDENT OF THREE DISTRICTS WILL BENEFITED FROM THIS PROJECT.

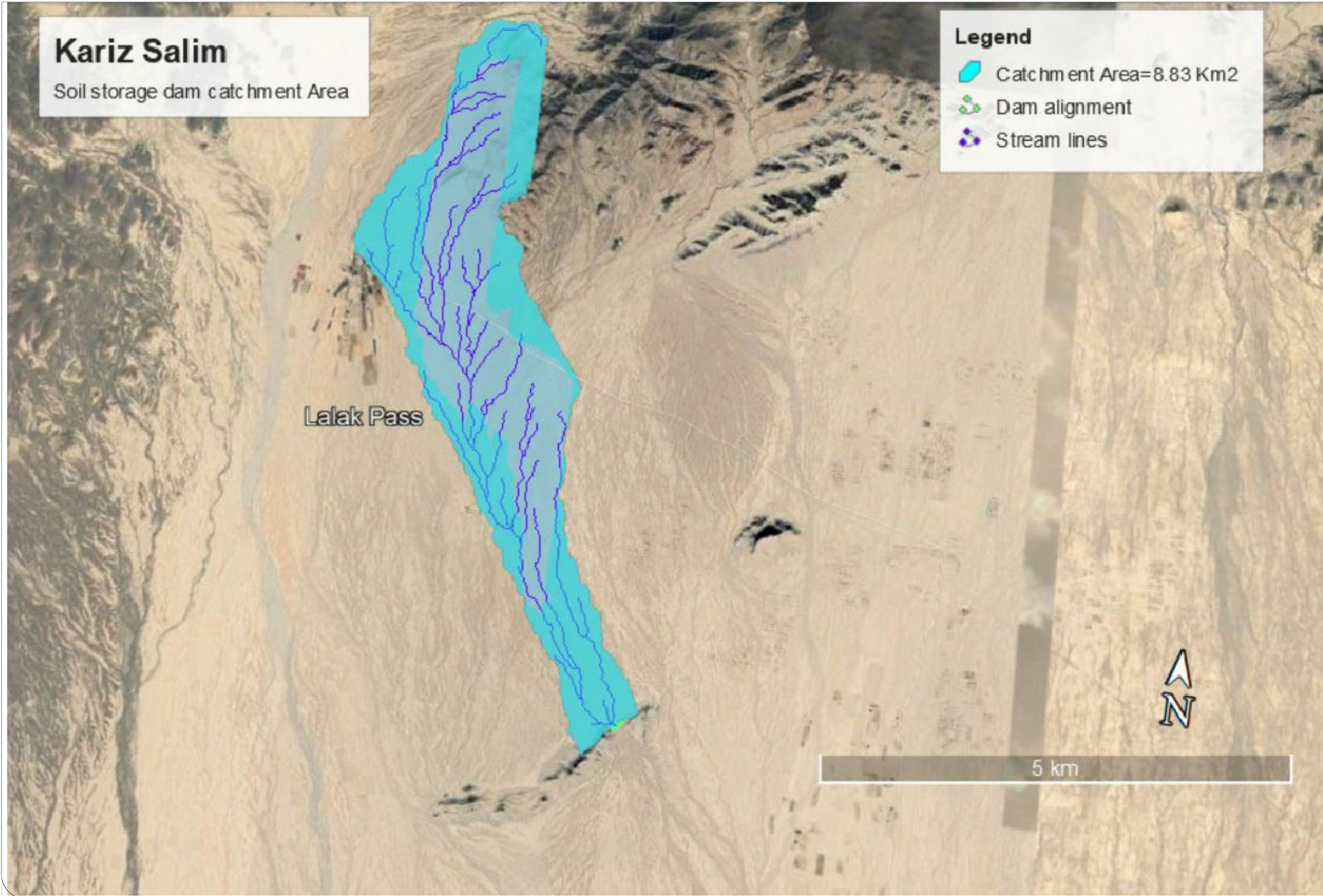
LEGEND	
BENCH MARK	
TURN IN	
PROPOSED PROTECTION WALL	
EXISTING STON MASONRY WALL	
CANAL CENTER LINE	
PROPOSED CONTROL GATE	
PROPOSED CULVERT	
AGRICULTURE LAND	
HOUSE	
MOSQUE	

NO	ABBREVIATION	FULL DESCRIPTION
1	CL	CENTER LINE
2	LB	LEFT BED
3	RB	RIGHT BED
4	MWL	MAXIMUM WATER LEVEL
5	EWL	EXESTING WALL
6	EG	EDGE
7	N	NATURAL
8	AG	AGRICULTURE AREA
9	SCL	START CENTER LINE
10	ECL	END CENTER LINE

BENCHMARK TABLE

Point #	Elevation	Northing	Easting	Description
1	1028.083	3504231.206	721728.634	BM1
2	1021.819	3504126.082	721552.859	BM2





Kariz Salim dam CAD drawings.dwg

15-MAY-2022



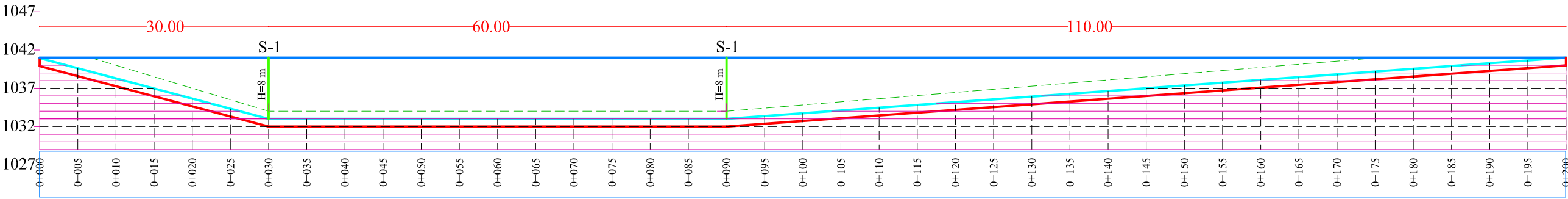
AFGHANISTAN		SURVEYED BY		ENG. MOHAMMAD NASEEM AFGHAN	CHECKED BY		ENG. BAKHTYAR ALKOZAI	PROVINCE	KANDAHAR	SCALE	AS SHOWN	PROJECT NAME :SALIM KARIZ STORAGE DAM, ZERAI, KANDAHAR
United Nation Development Program (UNDP)		DRAWN BY		ENG. MOHAMMAD NASEEM AFGHAN	REVIEWED BY		ENG. BAKHTYAR ALKOZAI	DISTRICT	ZERAI	SURVEY DATE	16-FEB-2022	
Southern Zone Kandahar		DESIGNED BY		ENG. MOHAMMAD NASEEM AFGHAN	APPROVED BY		ENG. MOHAMMAD SALEEM	VILLAGE	KARIZ SALIM	DESIGN DATE	15-MAY-2022	
ENGINEERING DEPARTMENT												DRAWING TITLE: GIS MAP, DAM LOCATION



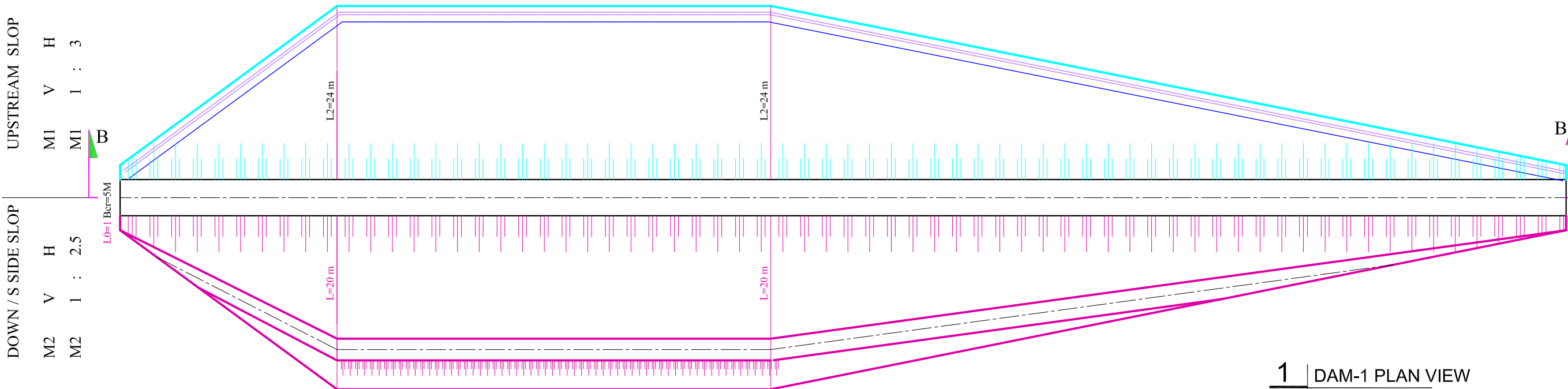
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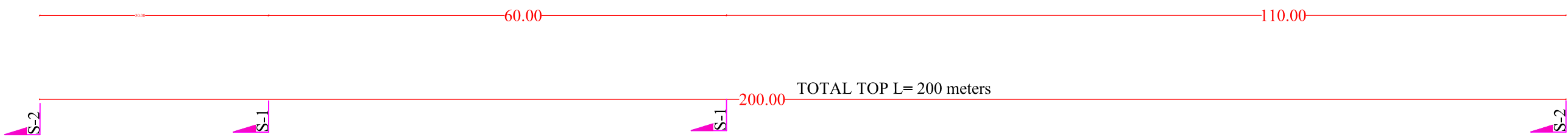
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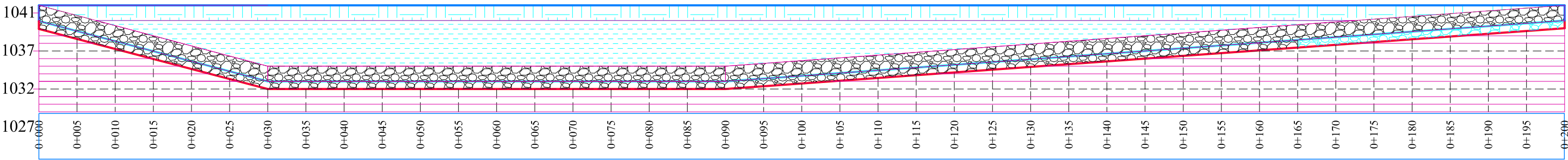


2 | DAM-1 LONG PROFILE OR B-B SECTOIN
SCALE NTS

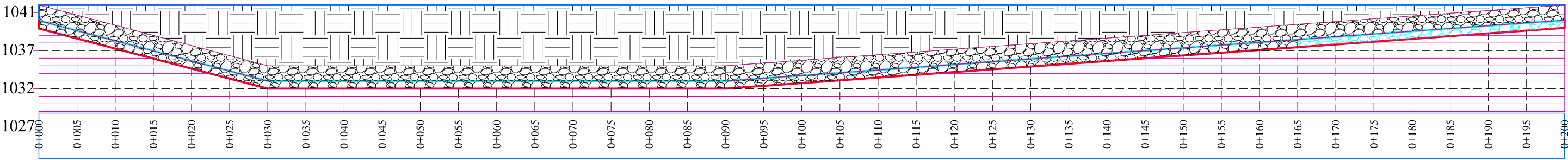


1 | DAM-1 PLAN VIEW
SCALE NTS

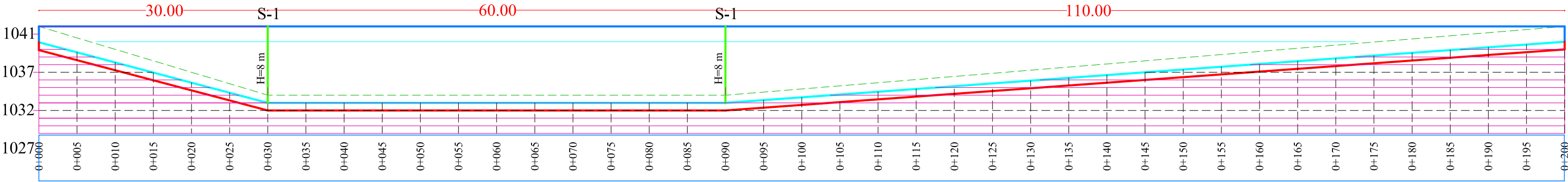




2 | DAM LONG PROFILE OR B-B SECTION
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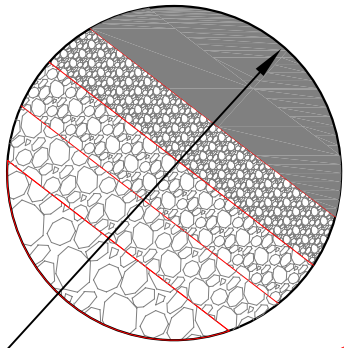
2 | DAM LONG PROFILE OR B-B SECTION
SCALE NTS



Kariz Salim dam CAD drawings.dwg

15-MAY-2022

DAM EMBANKMENT
SMALL SIZE SAND
SAND
SMALL SIZE GRAVEL
GRAVEL
BOULDER
ROCK



ROCK TOE
INVERTED FILTER ALL ALONG
THE DAM IN THE BACK SIDE

Natural Ground Level,NGL

DAM BED LEVEL

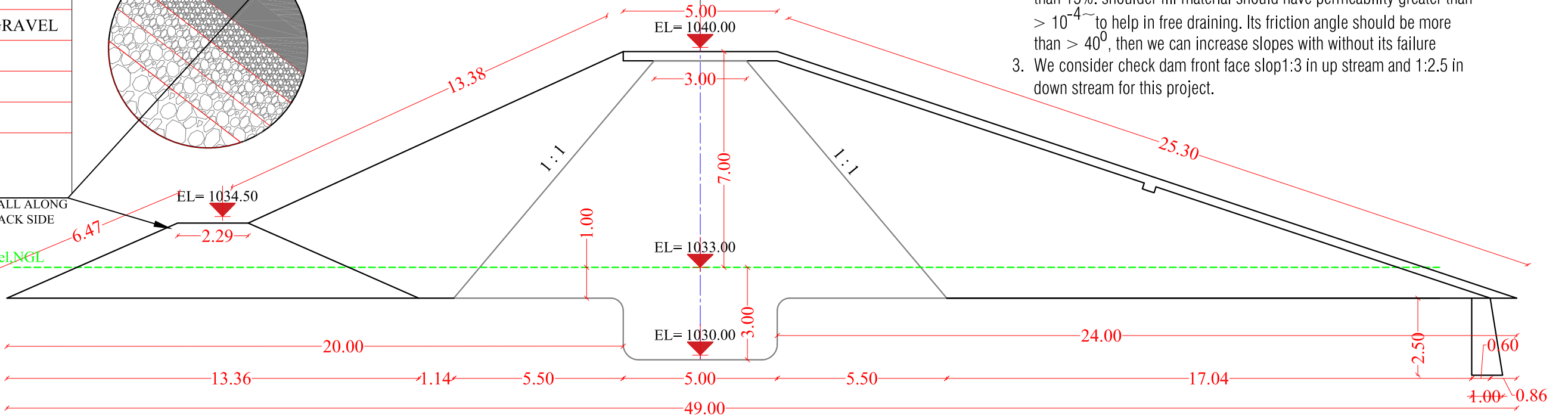
DOWN STREAM SLOP

M2 V : H
M2 1 : 2.5

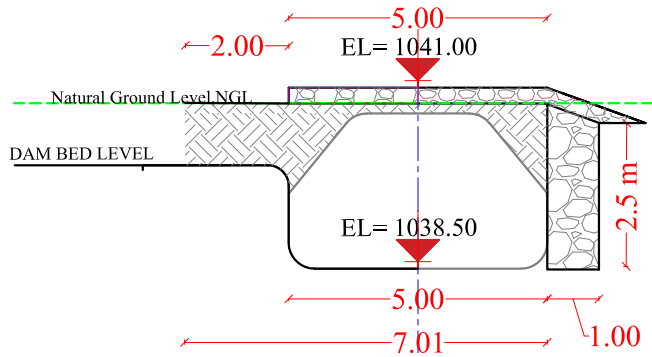
UPSTREAM SIDE SLOP

M1 V : H
M1 1 : 3

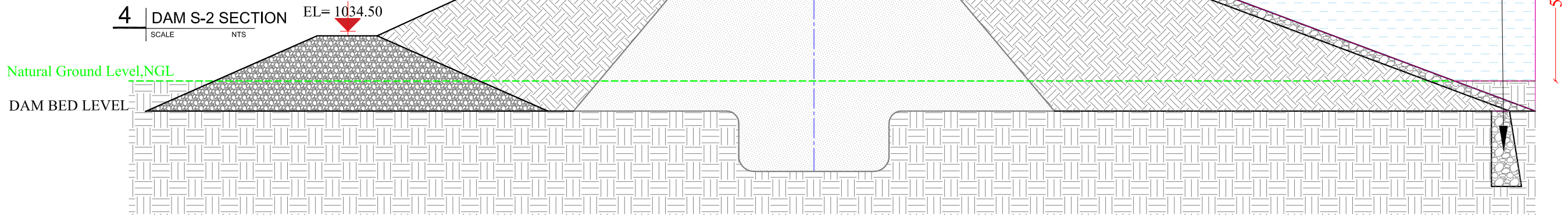
1. Stone pitching should provide (30 cm thick) on the crest as a crown.
So if the dam get overtopped the crest will have some resistance to erosion.
2. Clay used for the core should have permeability in a range of 10^{-6} to 10^{-9} m/s or percentage of fines (< 0.075 mm) should be greater than 15%. shoulder fill material should have permeability greater than $> 10^{-4}$ to help in free draining. Its friction angle should be more than $> 40^{\circ}$, then we can increase slopes with without its failure
3. We consider check dam front face slop 1:3 in up stream and 1:2.5 in down stream for this project.



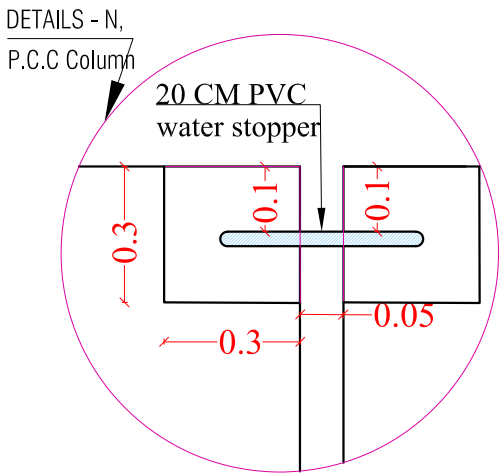
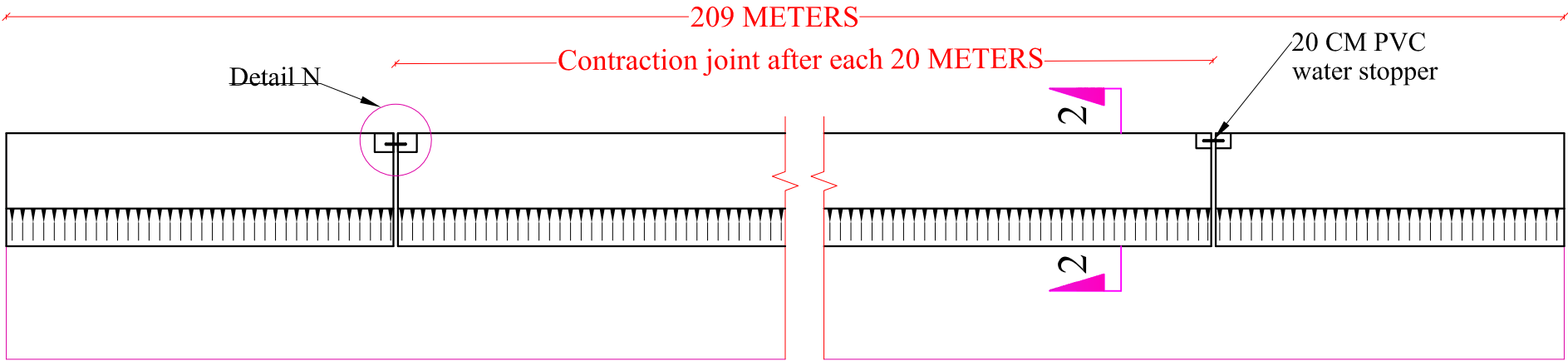
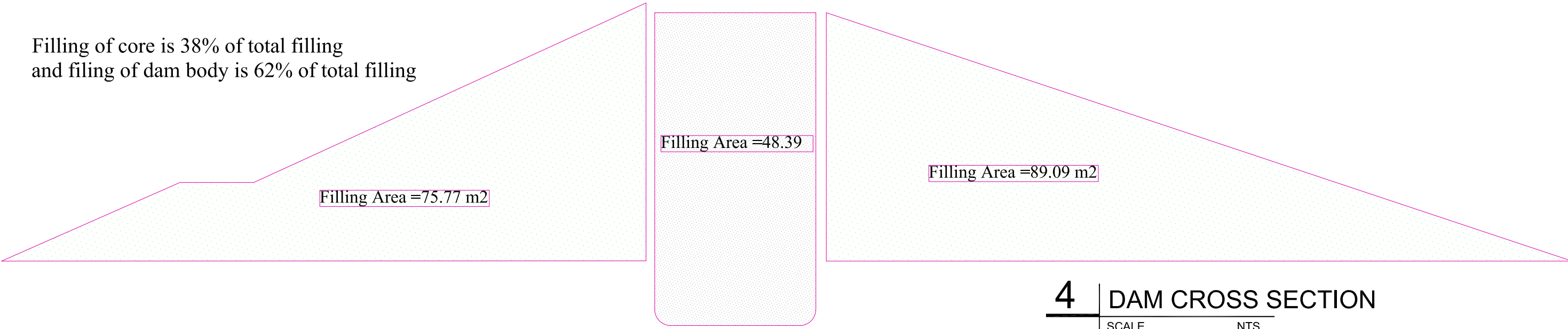
3 | DAM CROSS SECTION
SCALE NTS



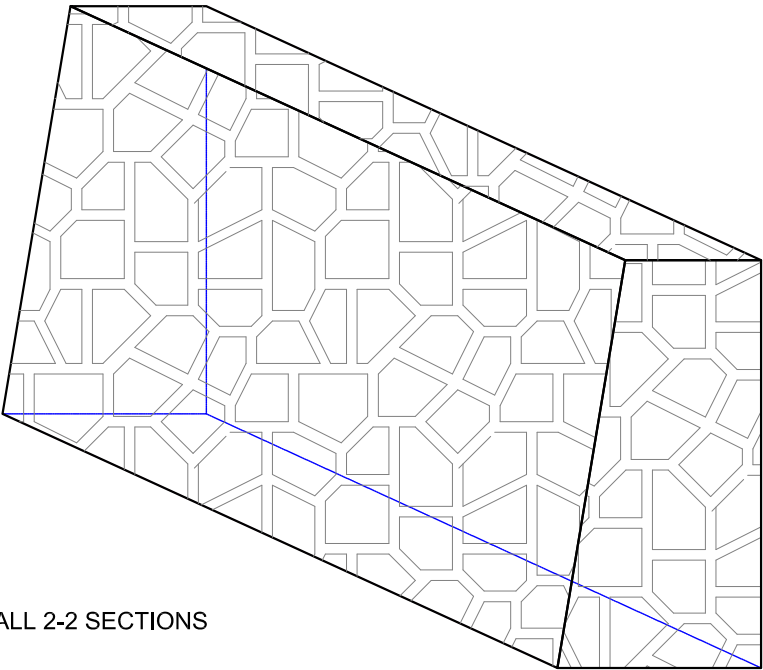
4 | DAM S-2 SECTION
SCALE NTS



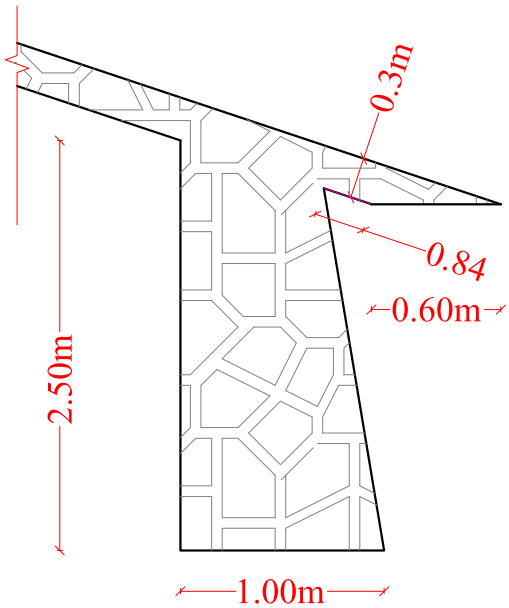
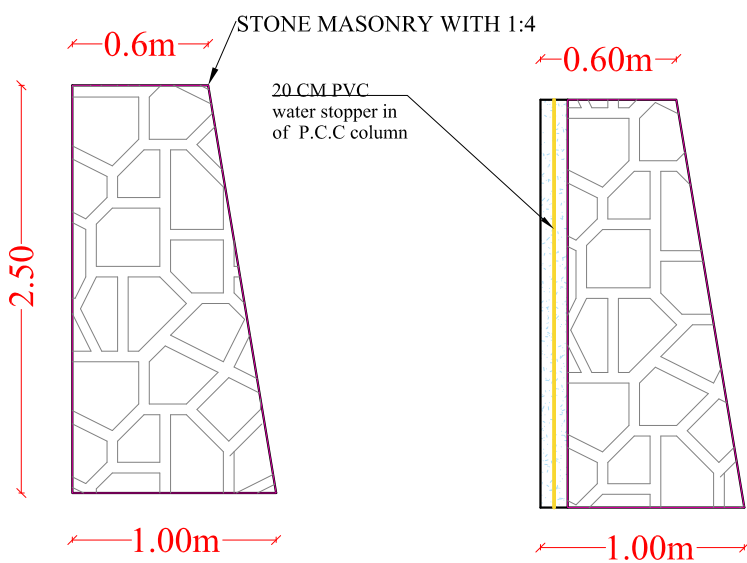
Filling of core is 38% of total filling
and filing of dam body is 62% of total filling



5 Dam-2 CUT OFF WALL PLAN
SCALE NTS

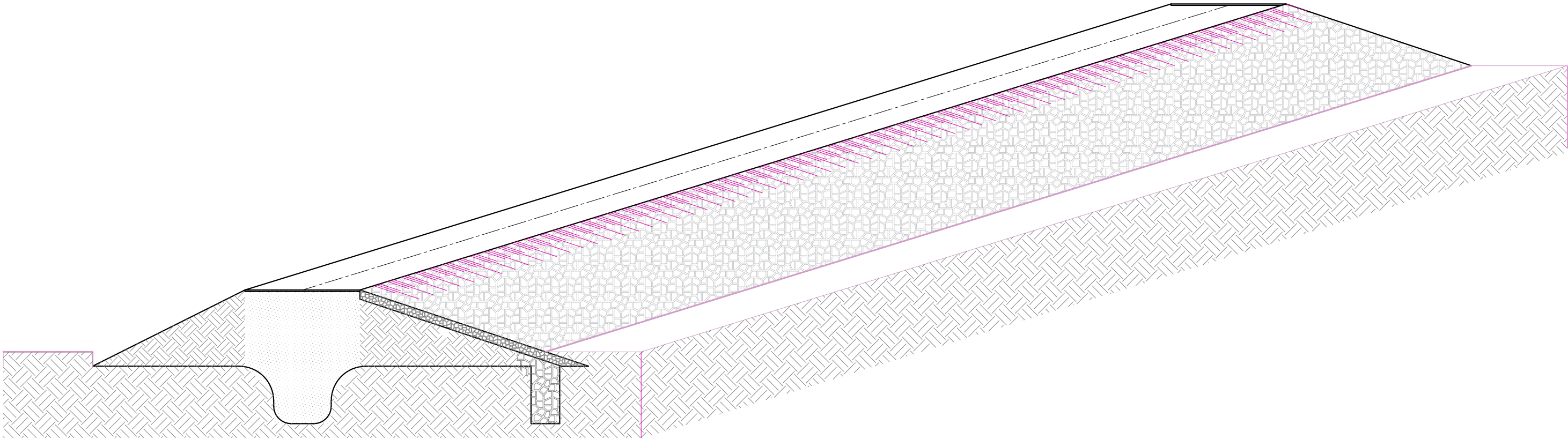


6 Dam-2 CUT OFF WALL 2-2 SECTIONS
SCALE NTS



Kariz Salim dam CAD drawings.dwg

15-MAY-2022



13 | A PART ISOMETRIC VIEW

SCALE NTS

AFGHANISTAN

United Nation Development Program
(UNDP)
Southern Zone Kandahar
ENGINEERING DEPARTMENT



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PROVINCE

KANDAHAR

DISTRICT

ZERAI

VILLAGE

KARIZ SALIM

SCALE

AS SHOWN

SURVEY DATE

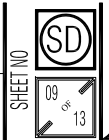
16-FEB-2022

DESIGN DATE

15-MAY-2022

PROJECT NAME :SALIM KARIZ STORAGE DAM, ZERAI, KANDAHAR

DRAWING TITLE: A PART OF DAM AS ISOMETRIC VIEW



NOTE:

1. The cutoff trench And Nucleus (core) portion of Dam Filling Materials must be consider of impervious material that have moor then 80 percent Clay , that will not allow the passage of any water (i.e. impervious).
For Cover Portion of Dam use impervious material that have moor then 55 percent Clay , that will not allow the passage of any water (i.e. impervious).
2. Basically, the textural classes involved are as follows: Any soil with more than 55 percent clay can be considered as a 'clay'. A 'sandy clay' is a soil with between 33 percent and 55 percent clay and up to 65 percent sand. A 'sandy clay loam' has between 20 percent and 30 percent clay and up to 80 percent sand and loam.
3. Texture tests :
Texture tests are carried out to determine soil types. Excluding stones and gravels,
4. The mineral part of the soil is made up of particles in three size ranges
A - Clay: less than 0.002 mm diameter.
B - Silt: 0.002-0.05 mm diameter.
C - Sand: 0.05-2.00 mm diameter.
5. Rapidly fluctuating water levels for long periods the dam should have impervious Foundation If seepage is excessive this can lead to instability and eventual failure of dam.
6. Most dams, homogenous or zoned, can benefit from the construction of a cutoff in
the foundation. A cutoff will reduce seepage and improve stability.
Whether stable clay, or other material is being used, the cutoff trench must be excavated to a depth that will minimize all possible seepage. Ideally, the cutoff trench should be dug down to solid rock that extends to great depths.If underlying rock is Assured or uneven it can be cleaned off and concreted to offer a good surface on which the clay can be laid.
7. For larger indentations or cracks, slush grouting should be used, which is a thick slurry mix of cement and water poured and boomed any question do contact with quality control engineer.
8. Generally, homogeneous dams should have relatively flat slopes (1:3 upstream and 1:2 downstream) as insurance against possible instability. for this project we consider both side slope 1:3 up and downstream.
9. A flatter upstream slope, required by all earth dams, allows the saturated section below water level to resist slumping.
10. . Also the weight of the water stored above it exerts a down force which, when combined with the weight of the dam, equals or exceeds the horizontal thrust exerted by the depth of the water against the embankment.
11. Water levels should not be allowed to fall or rise too fast, especially if the embankment material is impermeable. This is because a rapid lowering of the reservoir could lead to slumping of the upstream face or, if the wall has been allowed to dry, a rapid rise in level could lead to erosion through cracks and fissures. Both may eventually result in erosion, loss of material and, in a worst case scenario, a breach.
12. Every layer must be well compacted and if the whole dam length cannot be completed at any one time. Each section must be well keyed and bonded to the next since the cutoff trench and core are designed as one homogeneous unit to avoid seepage and structural problems,any more question do contact with Quality Control Engineer.
13. Compaction can be carried out by hand (tamping damp material by ramming poles 100-150 mm diameter) or by machinery (rollers or vibrators), or a combination of both.
14. Light irrigation of the borrow area, some hours before excavation, can often assist in the scraping and scooping of the material, as long as it is not too wet.

15. Rain on the site can cause problems and an over-wet clay will prove difficult to compact. In this situation it is better to wait for the soil to dry before continuing with construction.
- 16 Continual or, at least frequent, monitoring of core material quality, moisture content and layering procedures is advisable, especially where inexperienced plant
- 17 Soil pits and trenches dig soil pits and auger holes to assess the top and subsoil layers and the foundation condition in the embankment area.
- 18 Auger holes dug on a grid to depths of 3 m throughout a potential source area will allow a general assessment of soil types to be made. A series of trial pits and trenches can then be dug in more promising areas to allow a visual assessment of the soil profile to be made in line with local soil coding and classification techniques.
- 19 Samples can be taken for subsequent texture and laboratory analysis,any question do contact with Quality Controle Engineer.
- 20 INVESTIGATIONS
Ideally, the entire earth fill should be drawn from within the reservoir area and, if required, from any cut spillway areas.
- 21 The importance of a correct analytical approach to determine the various soil types for a zoned embankment cannot be stressed too much.
- 22 Although using a soil laboratory is expensive, the results can more than repay the cost involved and, more often than not, will ensure the exclusion of doubtful material in the construction process. This approach will include selecting the soils to be used, laboratory testing and mechanical analysis (if such facilities are available) to ensure the selected materials are suitable and interpretation of the results of these tests by an experienced engineer or technician to permit the appropriate materials to be used,any more question do contact with Quality Controle Engineer.
- 23 Core and cutoff material
A soil is required that will limit the passage of water but not to such an extent that undesirable differential pressures could build up across and within the embankment. The impermeability of the soil used will vary between localities, but some standardization of water tightness can be achieved through varying the degree of compaction involved.
- 24 A more pervious material will require greater compaction and vice versa. Generally, soils containing a significant percentage of clay are ideal for the core but clays with a tendency to crack should be avoided. If the latter are used they should be carefully compacted, placed in lower parts of the dam that are unlikely to dry out (such as in the cutoff trench) or covered by a gravel layer or topsoil with grass.
- 25 Sands and clays, and combinations of them, are most suitable for earth dam construction. Generally, however, silty soils are unsuitable because of their inherent instability when wet and should not be included in any of the earthworks.
- 26 To precisely define textural classes requires laboratory techniques but, with experience and specific local knowledge, hand testing to determine texture can prove important for the initial stages of identifying appropriate earth fill materials.
- 27 Clay soil areas can be demarcated in the field with the better soils (i.e. higher percentage clays) being reserved for the core and upstream shoulder of the embankment.
- 28 Silts are often similar in both appearance and feel to wet clays when dry but can usually be differentiated when wet as the clay will exhibit sticky, plastic-like characteristics while silt has a silky, smooth feeling with a tendency to disperse.

29. Hand-testing techniques involve the taking of a small sample of a soil - usually in the hand not required for making notes - dampening it (avoid soaking it) and rolling it into a ball to examine its cohesive constituents.
30. A better quality clay can be manipulated into a thin strip without breaking up, rolled into a ball and dropped onto a flat surface from waist height without cracking unduly. Also, when cut it will exhibit a shiny, smooth surface.
31. The best clay soil is always reserved for the core and cutoff and must be well compacted. Basically, the lower the clay percentage (to an arbitrary minimum as low as 3-5 percent), the more compaction and care in construction is
32. Sandy clay soils are most suited for inclusion in this upstream section as they compact well, have much reduced seepage characteristics but do not allow the build up of high soil-water pressures.
33. Clays are not required in the downstream shoulder as it is essential that this section is free draining.
34. Within a river valley a cross-section of soils may be available. The valley sides, where less leaching has occurred, can provide soils with a higher proportion of clay. The more heavily leached areas can provide amounts of sands, gravels and/or silts. The streambed proper should be a source for silts, sands and gravels, the latter being useful for drains and concrete work.
35. Of great economic importance is the need to find such materials close to the dam site, preferably within the reservoir area, and in large enough quantities to justify their removal. Avoid complete removal of impervious materials, as exposure of more permeable layers beneath could lead to seepage problems in later years, especially when under pressure of several meters of water.
36. embankment materials Semi-pervious materials such as sandy clays and clay loams with a proportion of fines, such as clay or perhaps silt particles, are suitable for inclusion in the upstream shoulder. These will allow a limited passage of water and, in a properly constructed embankment, will resist slumping when wet. Where poorer soils are used, special attention to compaction techniques will have to be given to minimize the volume of air spaces in the soil and to maximize its stability when wet.
37. Pervious materials such as coarser grained sand and gravels - suitably washed and screened/sieved for size and grade - are used in the downstream shoulder and sections of the embankment requiring mass and drainage.
38. Always seek specialist advice for use of these materials in drainage and filter works. These can often be better compacted dry or if only slightly damp. Once completed, a dry downstream face will prevent slippage and reduce risk of failure.
39. Materials to avoid
Should there be any question about a soil's suitability, it is safest to avoid using it. Some materials should never be used in dam construction, in particular the following: Organic material (except when used to top dress the embankment and other parts of the dam site at the end of the construction period).
40. Decomposing material.
Material with a high proportion of mica, which forms slip surfaces in soils of low clay percentages.
Calcite soils such as clays derived from limestone which, although generally stable, are usually very permeable.

41. Fine silts, which are unsuitable for any zone of the dam. Schists and shales which, although often gravelly in texture, tend to disintegrate when wet. Schists may also contain a high proportion of mica.

42. Cracking clays that fracture when dry and may not seal up when wetted in time to prevent piping through them. Sodic soils, which are fine clays with a high proportion of sodium. They are difficult to identify in the field, so any fine clay should be analyzed.

43. PH is the standard measure of acidity related to the concentration of hydrogen ions. A pH of neutral, soils with a pH between 1 and 7 are acidic and those above 7 (to 14) are alkaline.

44. A soil with a predominance of sand should not be used in dam construction. A sandy soil can be used in the downstream shoulder but should not be used elsewhere unless there is no alternative. If a sandy soil is used in the rest of the dam special attention must be paid to compaction, the best soil reserved for the core, and some consideration given to obtaining embankment water tightness by other means. Sands do have an important role in larger dams as a filter material.

45. LABORATORY TESTS

Laboratory tests on selected samples should be undertaken to confirm the field evaluations and to determine the physical properties of the soils. say in a silty-clay, but care must be taken in its use and application to ensure it is balanced with other soils and to keep percentage contents low. As they can be confused with fine clays, it is important to differentiate the two when testing for texture. Laboratory analysis may, therefore, be required.

46. FREEBOARD

Freeboard for small dams should never be less than 1.0 m preferred. Where wave action is likely, additional freeboard may be required.

47. SETTLEMENT ALLOWANCE

The embankment will always settle a little after construction and the finished crest should be given a settlement allowance that raises it above its design height at the mid-point by between 5 percent and 10 percent and tapering off to the spillway and valley sides.

48. STONE PITCHING AND TRAINING BANKS

Stone pitching is usually not necessary, as a good grass cover is normally sufficient to protect the embankment here. However, occasionally training banks may require stone pitching protection, depending on the climatic regime and likely flood flows.

49. The training banks should be long enough to divert water safely away from the downstream toe of the dam. They should have the same proportions and crest level as the main embankment. Where natural spillways are to be used.

50. Rollers:

Sheep's foot rollers can compact layers of soil up to 200 mm deep gross (i.e. about 150 mm after compaction) and satisfactory densities can normally be obtained with 6-12 passes at a roller speed of 3-6 km/h when the soil moisture content is right. It is important to keep these rollers clean as soil collecting between the feet will reduce compacting ability. Sheep's foot rollers are more *eKective* than other rollers in compacting drier clay (but will require more passes) and will churn and blend the soil which is useful in distributing water throughout the construction surface when borrow pit irrigation is not possible.

Vibrating rollers are more suited to the compaction of sandy Soils and where resulting very high densities are required. In dam construction their usefulness is usually limited to small-scale work such as narrow cutoff compaction, trench work and similar.

52. Rammers and plates have much the same application and are used where space is a limitation and in specialized work such as trenches, behind concrete and around pipe work.

53. Smooth wheeled rollers are more efficient at reducing air-spaces and continue the compaction of lower layers of the embankment through new layers to a greater extent than comparable sheepsfoot rollers. On similar layer depths, and at the same speed, a smooth wheeled roller would probably require slightly fewer passes to obtain similar soil densities when compared with sheepsfoot rollers.

54. COMPACTION EQUIPMENT AND TECHNIQUES

The compaction of soil is essential to increase the shear strength of a material to achieve high levels of embankment stability. A high degree of compaction will increase soil density by packing together soil particles with the expulsion of air voids. Comparing the shear strength with the moisture content for a given degree of compaction, it is found that the greatest shear strength is generally attained at moisture contents lower than saturation. If the soil is too wet, the material becomes too soft and the shear stresses imposed on the soil during compaction are greater than the soil's shear strength, so that compaction energy is dissipated largely in shearing without any appreciable increase in density. If the soil is too diy, a material compacted in this condition will have a higher percentage of air-spaces than a comparable soil compacted wet. It will take up moisture more easily and become more nearly saturated with consequent loss of strength and impermeability.

55. CONSTRUCTING THE EMBANKMENT The core/cutoff trench

As this is the most important part of any embankment, great care is necessary in the excavation, fill and use of material. Width and depth should have been determined at the design stage.

Width (2 m

minimum) will often depend on the equipment used in the excavation and also on the size of the dam otherwise use formula if you have any question do contact with QC engineers.

56. The minimum depth necessary will depend on site conditions but in all excavations the cutoff trench must be taken down to good quality impermeable material such as clay or solid rock

57. If rock is located and is generally good, it is permissible to fill any cracks or fissures with compacted clay or mortar, provided they can be fully cleaned and traced to ensure seepage paths will not develop later.

58. If permeable material is found it is vital that the cutoff is taken through it to a depth sufficient to find more impermeable material.

59. Before backfilling, the excavation should be checked to ensure that the conditions above have been complied with. Short cuts taken at this stage can prove costly later and seepage through the embankment can become excessive if the correct depth into the correct material is not achieved. A little extra time and care in the excavation of the core is usually worthwhile,

60. Other requirements such as coffer dams, special compaction, dewatering equipment

and safety provisions in the trench should be considered before excavation starts, to allow the work to be carried out efficiently.

61. An assessment of the site condition, for example to ascertain groundwater levels, at the design stage would allow such special provisions to be included in the cost estimates.

62. Once the excavation has been checked and found satisfactory, backfilling can occur. The best clay soil should be used and compacted in layers no more than 75-100 mm thick (50-75 mm is best), throughout the length of the trench.

63. SPILLWAY :

Natural spillways are generally best for all earth dams but often some degree of cut is required to obtain the necessary design slopes. In all cases the movement of machinery over the spillway area should be minimized to avoid over compacting the existing soil.

64. Any large volume spillway cut should be done at a time when the excavated material (if suitable) can be included with the material being moved to construct the main embankment or reserved to fill in borrow pits. Smaller volumes of cut material can usually be included in the training bank.

65. slope (cross fall) towards the upstream side of the embankment to permit the safe drainage of rainwater to the reservoir rather than the downstream slope. Over the next few months, and finally after one year, the embankment should be rechecked to assess settlement and to allow the placement of soil at any sections that settle to below horizontal.

66. The spillway should be checked to prove the design slopes were adhered to. If large flood flows occur, or are expected, stone pitching or concreting of the end of the embankment and one or both sides of the spillway channel may be necessary to reduce the risk of erosion.

67. It is very important that good grass cover, preferably of creeping grass type, is established on both the embankment and the spillway before the likelihood of heavy rains. This could mean constructing most of the spillway before work on the embankment itself starts, ideally at the end of the previous rainy season when water for establishing grass is available.

68. Either way, the last soil layers to be laid on the embankment, and on any spillway cut sections, should be of good quality topsoil so as to encourage rapid and dense grass growth. Manuring and irrigation may prove beneficial. To minimize erosion caused by people and animals the embankment should be fenced and gated and, in some cases, special protected pathways for watering livestock should be provided to keep animals well clear of sensitive areas.

69. If erosion does occur, particularly at the early stages, much time and effort can be saved by prompt remedial action. After any heavy rainstorm the dam should be inspected. Any rills or gullies filled in and replanted with grass before the situation becomes too advanced. Where soil and grass cover are difficult to establish, wiring of the topsoil and vegetation may assist in re-turfing with suitable sods in any holes that occur.

70. All new dams that have not completely stabilized and settled require frequent visits again and, again, the beginning of the rainy

INSPECTION REQUIREMENTS:

At the time of siting the dam it should have been made clear to the local community/dam owner that to maintain the dam in good condition and to prolong its life as a sound, useful water resource, competent and timely inspection and maintenance are going to be required.

71. All dams must be inspected at least annually. In dry season climates the best time to carry out this work is before the beginning of the rainy season, when most of the dam and its reservoir area can be seen.

72. Time after the inspection (and before the rains begin) must be allowed for to complete any remedial or repair work.

73. All dams with grass spillways must be visited after every heavy rainstorm and flood. This is most important at the beginning of the rainy season when, because of limited grass cover, erosion risks are highest.

74. season is an important time, especially if a grass cover has not been established. After the first year or so, a more routine inspection programmer can commence. Initially visits (which will vary from site to site) should not be less than twice a month and after every rain or flood.

Seepage and drainage :

75. All earth dams will leak to some extent and seepage only becomes a problem if it endangers the embankment - either by encouraging erosion in the downstream area or by causing water logging of the dam and thus affecting its stability.

76. Dirty water seeping from the downstream face of any dam is cause for concern. As finer materials are eroded, and carried out of the embankment, this could lead to piping or slumping in the structure.

77. At the time of construction and, particularly if the dam does not have a dry, well-drained downstream foundation area, drains should be installed before the embankment is built. If this was not done and seepage has become excessive, the following may reduce the problem:

Settlement :

78. However well the dam was built, it will always experience some settlement. Most dams settle out in the first year or so after construction. Invariably most settlement occurs at the highest point of the dam where mass is greater and other pressures highest.

79. At the time of construction a settlement allowance should have been incorporated on the top of the embankment. At every inspection the crest must be checked to ensure it remains horizontal and that no low spots have developed.

80. All over settlement must be attended to with backfill and additional monitoring. If this is neglected, and should either the crest level fall overmuch, or an exceptional storm lead to backing up of floodwater from the spillway, the dam will overtop, water will concentrate in the low spots and serious damage result.

81. Unusual settlement in an older dam can indicate foundation movement or removal of embankment material by seepage or erosion. Always seek expert assistance when this occurs. Another form of settlement can arise when, due to poor constriction techniques, the core has been compacted comparatively more than other parts of the embankment.

82. The upstream and downstream sides or shoulders of the embankment settle more than the core as they are less well compacted and, as the foundation is firm (and it cannot fully absorb the differential settlement), cracks appear along the crest edges as the settlement takes place. These cracks do not represent a serious problem and can usually be treated by ramming in damp soil complete with grass as soon as they develop. It is important to prevent water entering such cracks (otherwise erosion and water logging will follow) and in the rainy season it may be necessary to sandbag the area to minimize runoff.

83. When large, deep cracks appear on older dams (indicating foundation movement or slumping of either shoulder), the reservoir water level must be lowered and expert assistance must be sought without delay.

TREES AND BUSHES :

84. Do not allow trees, bushes or other deep-rooted plants to grow anywhere near the embankment the spillway and its outfall. Keep all parts of the dam clean with a low grass cover to protect against erosion and assist inspection and maintenance. Trees on the embankment do not help stabilize the soil and their roots will eventually reach to water. When dead and decomposed, pathways for insects, animals and water are then formed. Therefore, remove all trees and bushes before they become established.


85. In a situation where large, old trees have been allowed to establish themselves on the embankment they should be removed when the upstream water level is low. The trees should be cut as low as possible and, if the stumps cannot be excavated, they should be soaked in petrol and burnt or treated with chemicals to Most gullies in the spillway areas and on embankment slopes are started when rainfall and the subsequent runoff concentrate in depressions caused by footpaths, vehicle tyres or animal tracks.

86- To determining foundation strengthen and impermeability it is required to test it stability against settlement as well result of laboratory test should be check by QC engineer .

87 - Embankment back fill materials should be check in laboratory to determine it's imperiously characteristic of materials which is used on dam body construction base on project requirement , alter QC engineer approval it can go ahead for remaining construction activities .

88- Several compaction and back fill materials laboratory tests are needed to be considered in estimation volume schedule(BoQ).



<div><div>AFGHANISTAN</div><div>United Nation Development Program</div><div>(UNDP)</div><div>Southern Zone Kandahar</div><div>ENGINEERING DEPARTMENT</div></div> <div><div>Empowered lives. Resilient nations.</div></div>	SURVEYED BY	ENG. MOHAMMAD NASEEM AFGHAN		CHECKED BY	ENG. BAKHTYAR ALKOZAI		PROVINCE	KANDAHAR	SCALE	AS SHOWN	PROJECT NAME :SALIM KARIZ STORAGE DAM, ZERAI, KANDAHAR
	DRAWN BY	ENG. MOHAMMAD NASEEM AFGHAN		REVIEWED BY	ENG. BAKHTYAR ALKOZAI		DISTRICT	ZERAI	SURVEY DATE	16-FEB-2022	
	DESIGNED BY	ENG. MOHAMMAD NASEEM AFGHAN		APPROVED BY	ENG. MOHAMMAD SALEEM		VILLAGE	KARIZ SALIM	DESIGN DATE	15-MAY-2022	
DRAWING TITLE: SITE PICTURES											<div><div>SHEET NO</div><div>03</div><div>13</div></div>