d

7

Mfiu”yé“y ózYu “y3gwu”y T ff u főé d ó–yw Ny y”őff…yé fé byffu” DK Mu y g x óz fiy gf• u T ff u főé d ó–yw

O4Lfl gfé“fi Nfiu…fl

a 4hywfi4k u y f y ó wy Ny y”őff…yé .Th f óó •yy2867738679 /

82a u 2868? .7CLufl u•fi 86B9/

e

8

c ”fléy óz fiy d y yé u fŏé

T ff u fŏé Ny y”ŏff…yé Sfl ó
gfl• u T ff u fŏé d ó–yw3Tle óx wfŏé
a u–é Mfiu”’yé“ y
Nfl ffy fl y góff uéx Mó ff fŏé Mu y
a u–é hu•yu u

i

74Sfl ó flwu” Ny y”ŏff…yé

74Lyzó y 7C;6 Pu …y a uéu“ yx T ff u fŏé g y…

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Te yé fl y Ny y”ŏff…yé dfiu y

Lu flwb yyx P ” ”…yé

T ff u fŏé a u y ff”ué27CC6

Pów óé Ró y é…yé 3Pu …y - du éy fifff

d fŏ fl óé R ó éx3k u y T ff u fŏé

847C;6 37CB6 3Tezu w y Ny y”ŏff…yé dfiu y .O yé fl y Ny 4

:48666 óé u x

Yu “ y gwu”y2a ” fff ffó y T ff u fŏé d ó-yw

Pów óé y”fluv”y myu 3ó éx fl ff u fŏé

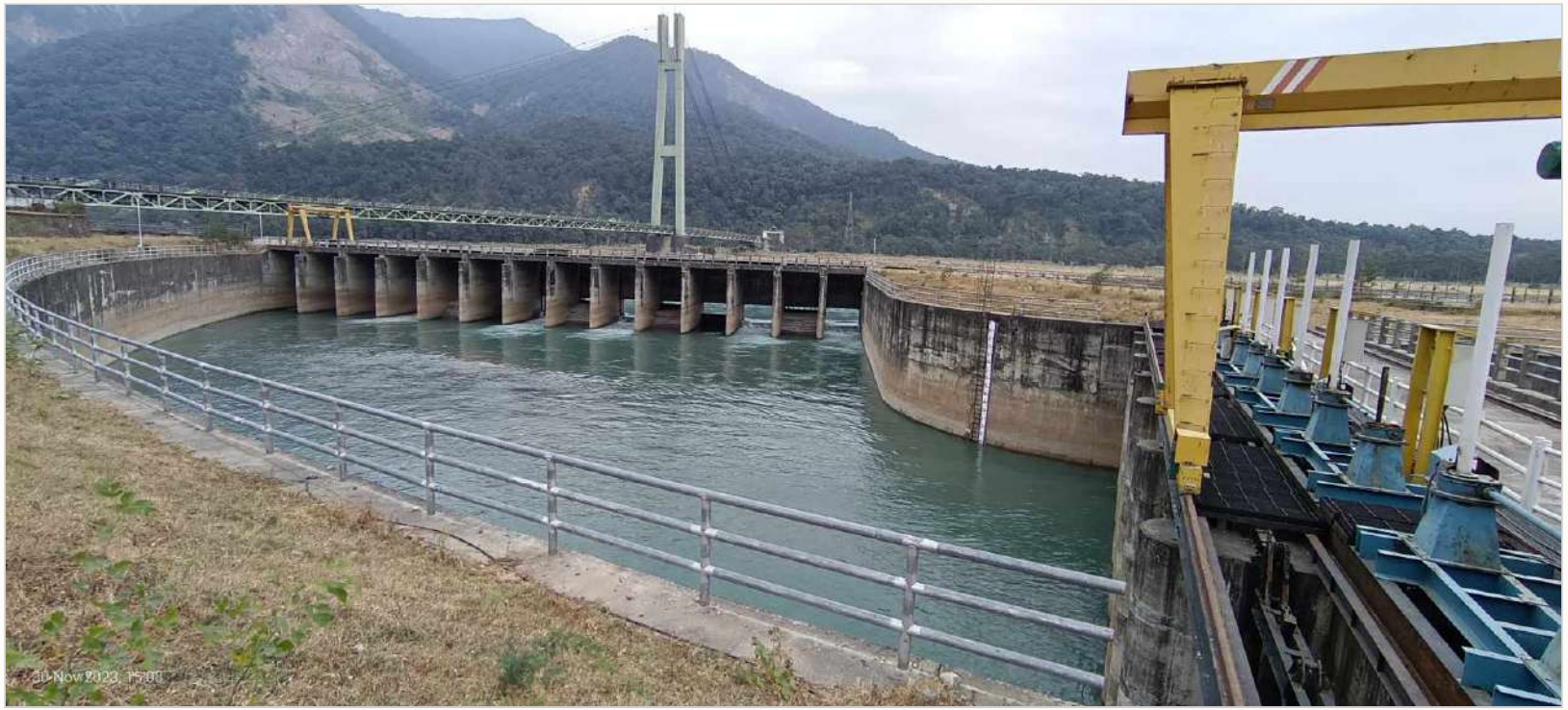
L óux” Mu y“ ó fl yx éxy Pó dfiu y

I

Sfl ó flwu” Ny y”öff…yé 3Kwfifly y…yé

k y ó y” y wué ff”ué2Ny ff é uéx T…ff”y…yé u”” ffy ózfl ff u flöé ff ó–yw zó…W ”ö ó Te y 3vu fle k u y h ué zy

k y u y uv”y ó …uéu“ y Te y …yé y flyx zó ó N yu…d ó–yw zó…ó ó é f y ó wy



f uéflШu…u u W ”u fl u T ff u fбé d ó-yw

gfl u T ff u fŏé d ó-yw

LuvuflT ff u fŏé d ó-yw

T ff u fŏé Ny y”ŏff…yé zó…94; Yuwfiu4.7C?6/ ó 7; 4A fiu4.868; /

m

84gfl• u T ff u fŏé d ó–yw

Sfl ó fwu” Luw•“ ó éx

7CA; 37CABD

d y3Pyu flvfffl g x .k y f uff fla ”fff ffó y d ó–yw/

7CB6 D

Pyu flvfffl g x f yffó v Yufi…y y Te y éu fŏéu”

hywfiéfwu” K fl uéwy v KNL uéx i b Nd

góff hy Mu fly x ó fé fiy KTh Lué“ •ó• Yuvó u ó

7CB9 D

Ny uff Pyu flvfffl f yffó

Nyffu …yé ózS x ó”ő“ uéx a y yó ó”ő“

Móé wyx 9• … Muéu” uéx d ó–yw Mu…ff u b yffu”“ é–

866: D

i ffxu yx Ny uff Pyu flvfffl f yffó

Pfléuéwflu” g ffffó zó… O óffyué i éfŏé .Oi /

n

84gfl• u T ff" u ffbé d ó÷yw

Sfl ó ffwu" Luw• " ó éx

hfiy Rób fly x ó ywyfl y éuéwflu" ffffó zó…xfl y yé Te y éu ffbéu" Ny y"őff…yé K" yéwfly
K flué Ny y"őff…yé Lué• .KNL/
O óffyué i éffbé .Oi /
gu xflP éx zó Ny y"őff…yé .gPN/
W ufl P éx zó Ny y"őff…yé

97 a u 2866: D

d ó÷yw fl uffff ó yx v fiy bdMzó T..ff"y…yé u ffbé

7 U éy2866: D

Texflué O…vu yé "y y ó fiy Rób éó ó ff ówyyx fiy ff ó÷yw
K"" fiy TNK u" yéwfly yz yx ó ffffó fiy d ó÷yw

A a u wfi2866; .L4g486?75775B: /D

hfiy Rób Nywfkyx ó fl..ff"y…yé fiy ff ó÷yw flfi fl ó é y ó wy

r

84gfl u T ff u fbé d ó-yw

d ó-yw Pyu y

Mó…..uéx K yu

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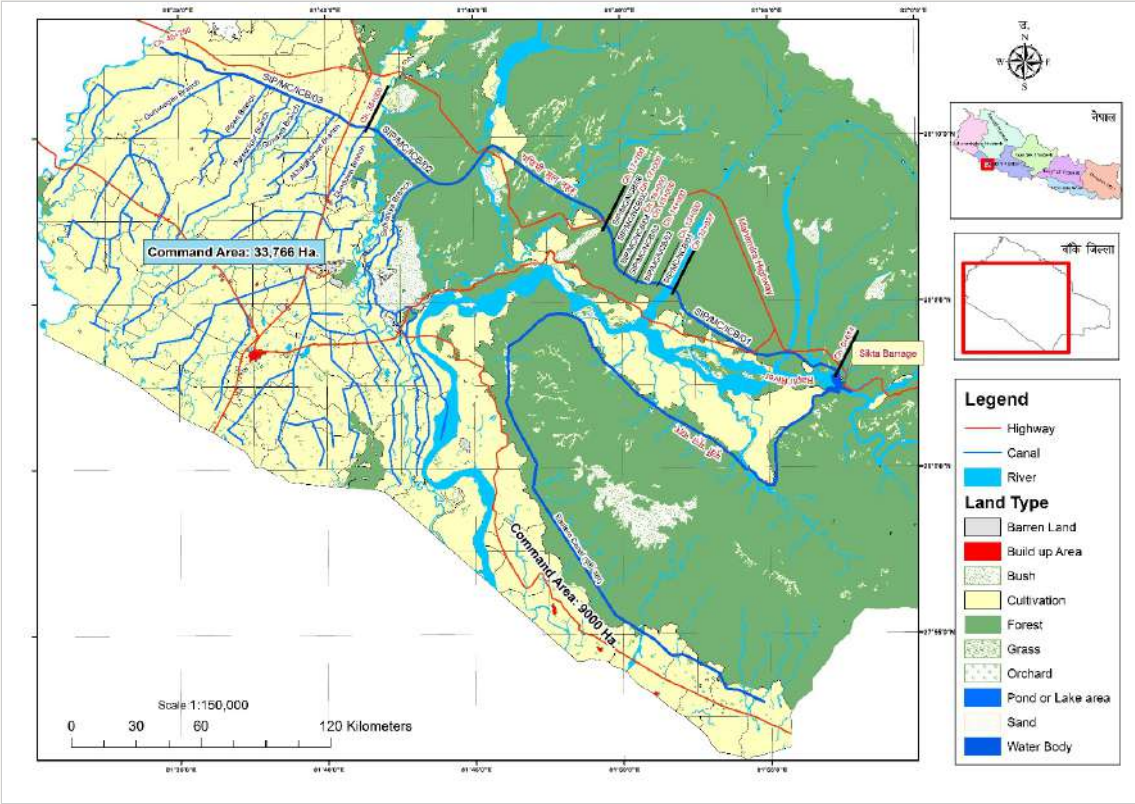

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Muéu”D

Muéu”.k y /D; 6 •…

Muéu”.Ou / D; 94; •…

Ny ff é Nfl wfiu “ yD

k y Muéu”D; 6 …95 yw

Ou Muéu”D7: 4C…95 yw

d ó-yw Mó D

c ff ffléu”Db 4784; L ff”ffbé

M yé Db 4; 8 L ff”ffbé

d ó-yw d ffbx D

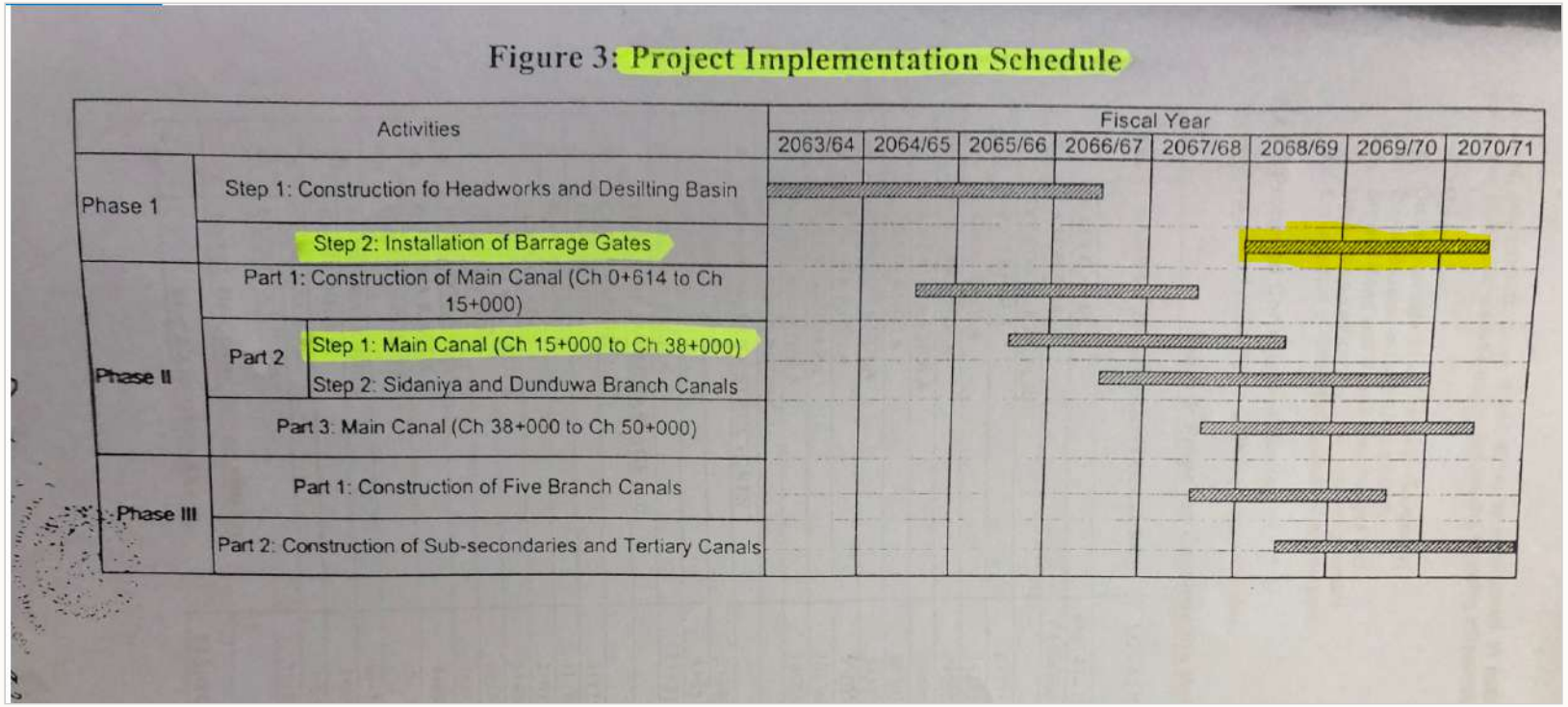
g u yx DP4m486?85?9

Mó…ff”y ffbéDP4m486BC5C6

dfiu y TDMóé wfŏé ózSyux ó •

dfiu y TTDa ufé Muéu" uéx gywóéxu Muéu"

dfiu y TTTDg v3gywóéxu 2hy flu uéx Mó…..uéx K yu Ny y"ŏff…yé .MKN/



84gfl• u T ff u fŏé d ó-yw

Móé wfŏé d"uééfé"

t

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84gfl u T ff u fl ó é d ó-yw

M yé g u .g ó wyDgfl u T ff u fl ó é Kéé u” Lóó• 86B75B8/

dfiu y TTTDg v3gywóéxu 2hy flu uéx Mó…..uéx K yu Ny y”ó ff…yé .MKN/ ó • fl óé“ ó fl é“

g ó wyDgfl u T ff u fl ó é Kéé u” Lóó• 86B75B8

Lyzó y gfl u .Nyw867?/

Kzy gfl u .Nyw868: /

da

94a u-é Mfiu”ˆyé“ y

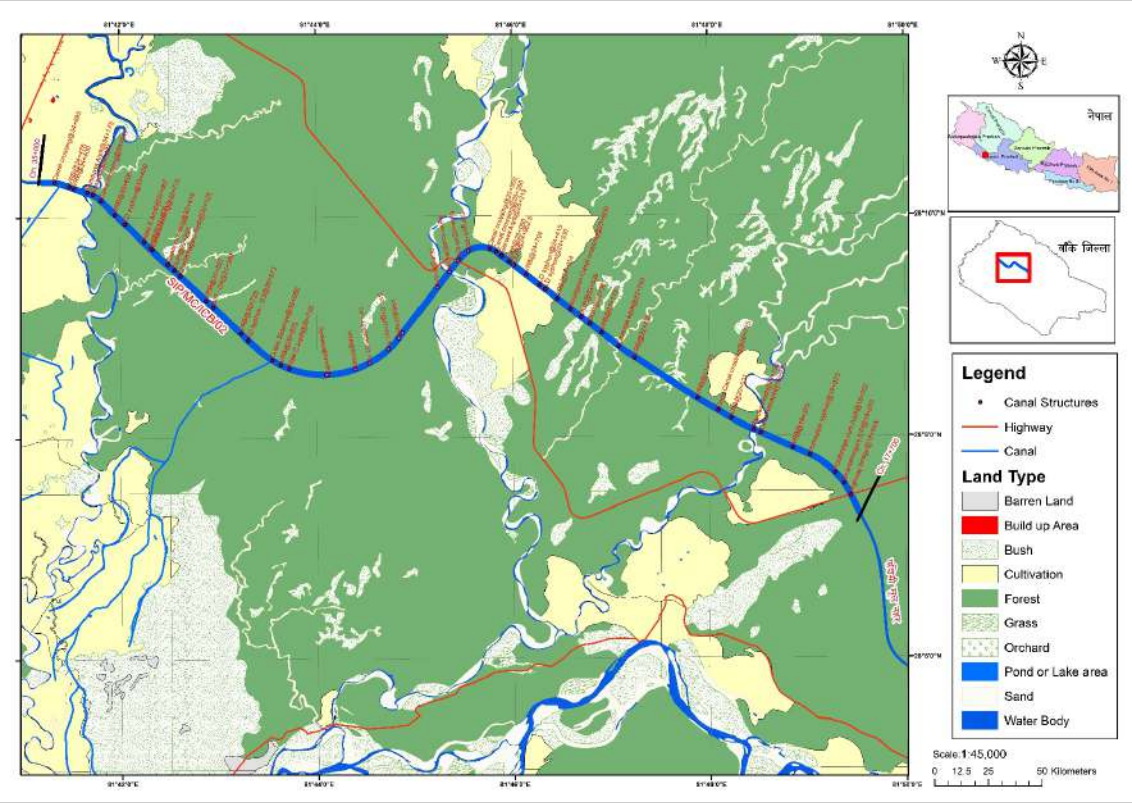
74a uéu“ y…yé ózPfŕéuéwfŕu”f y ó wy uéx c v-ywfŕbé ózx5 fffu fŕué wó é

84Muéu”K’ff é…yé uéx f “ “ yx hóffó“ ufffi 3Nyyff M fŕé“ ff3ó 96…uéx Muéu”vyx ”ˆfŕé“ ff3ó 76…

dd

94a u-ó Mfiu”ŷyé“y 4

94K ”u “y é …vy ózwó fŕé“ w y ”ówu yx u fiy vu y óz fiy Mfi fl u ué“y



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94a u-ó Mfiu”ỳé“ y 4

A4d y yéwy óz Nfl ffy fl y góf̃ fé ó…y ywfb́é

Kvó 7; …Muéu”wó”’uff yx x fłé“ Pfl hy f é.8B U éy2867?/

Mfi4D8?1966

Kvó A…Muéu”wó”’uff yx x fłé“ Muéu”c ffy u fłbé.8? U ” 2867B/

Mfi4D8?1966

dl

: 4Nfl ffy fl y góf uéx Mó ff fé Mu y

k fiyé uéx fió u xfl ffy fl y óf ywó“ éfl yx f fiy y”xl

dm

: 4Nfl ffy fl y gófl 4

k fiyé uéx fió u xfl ffy fl y ófl ywó“ éfl yx fĺé fiy y”xl

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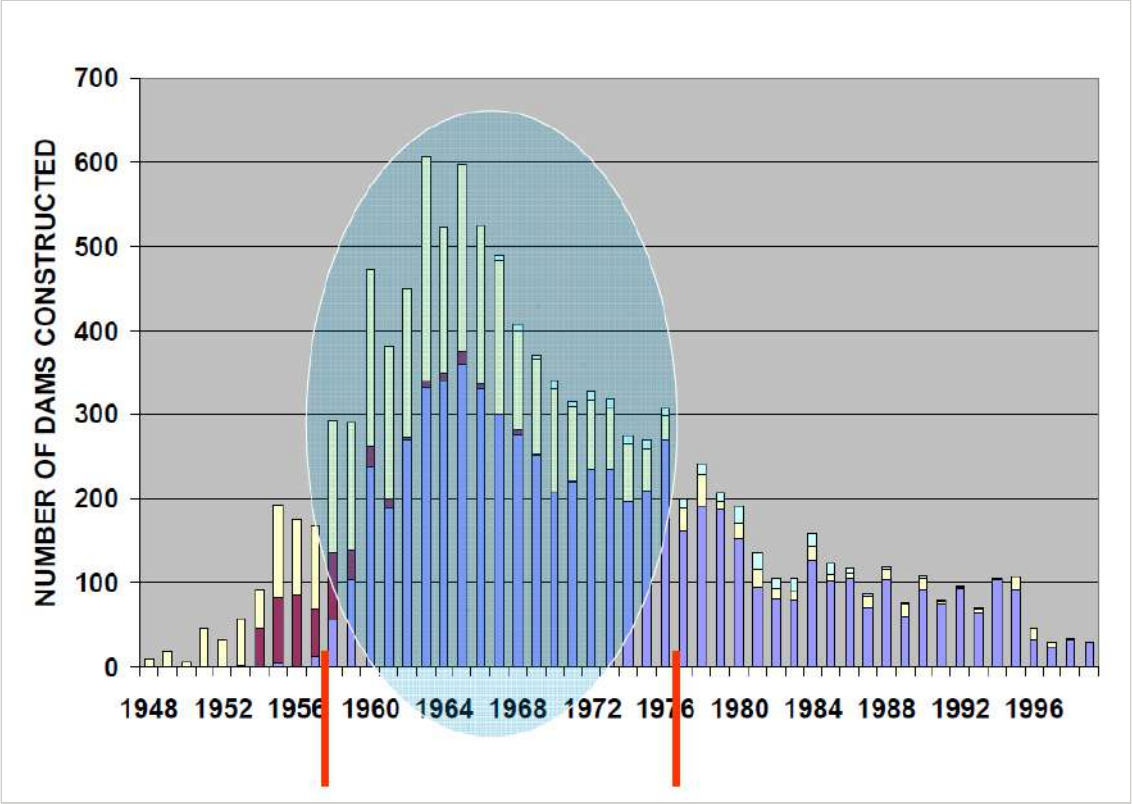

hyé óz77 c Wxu… zuflyx óé "fé" 2

Nu…Móé wfóé Sfl ó ózbf Mg .Pó …y " gMg/

A6661 xu… wóé wyx vy yyé 7C: Cuéx 7CB6

i éfl y u" yu óé zó zufl" y u Nfl ffy fl y gófl"

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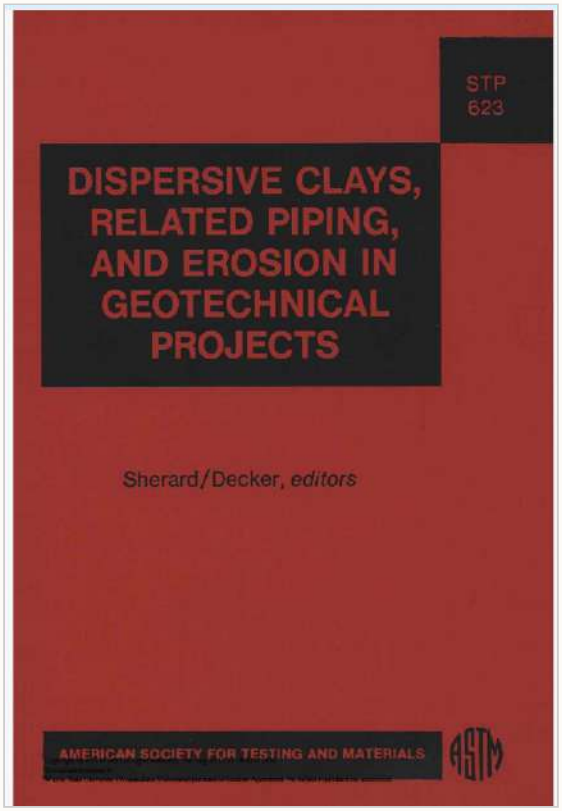

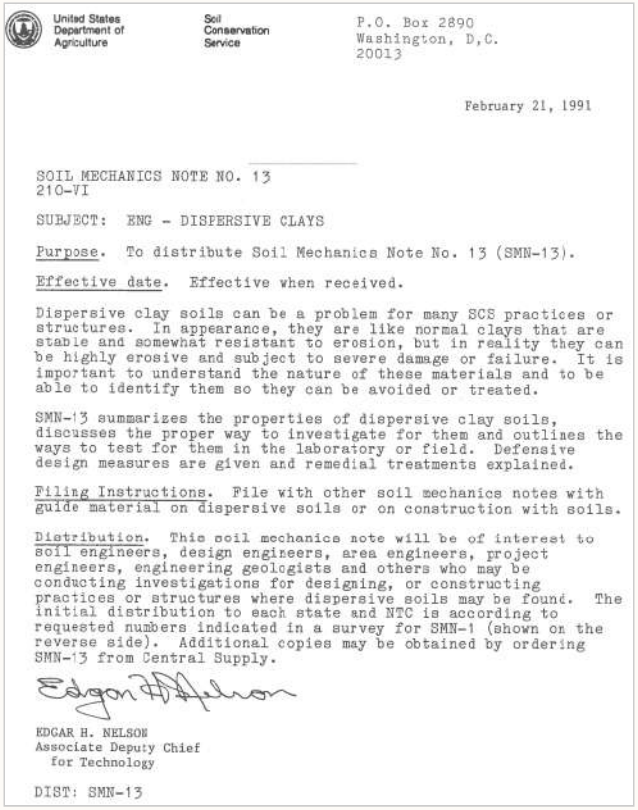

United States Department of Agriculture

Soil Conservation Service

P.O. Box 2890
Washington, D.C.
20013

February 21, 1991

SOIL MECHANICS NOTE NO. 13
210-VI

SUBJECT: ENG - DISPERSIVE CLAYS

Purpose. To distribute Soil Mechanics Note No. 13 (SMN-13).

Effective date. Effective when received.

Dispersive clay soils can be a problem for many SCS practices or structures. In appearance, they are like normal clays that are stable and somewhat resistant to erosion, but in reality they can be highly erosive and subject to severe damage or failure. It is important to understand the nature of these materials and to be able to identify them so they can be avoided or treated.

SMN-13 summarizes the properties of dispersive clay soils, discusses the proper way to investigate for them and outlines the ways to test for them in the laboratory or field. Defensive design measures are given and remedial treatments explained.

Filing Instructions. File with other soil mechanics notes with guide material on dispersive soils or on construction with soils.

Distribution. This soil mechanics note will be of interest to soil engineers, design engineers, area engineers, project engineers, engineering geologists and others who may be conducting investigations for designing, or constructing practices or structures where dispersive soils may be found. The initial distribution to each state and NTC is according to requested numbers indicated in a survey for SMN-1 (shown on the reverse side). Additional copies may be obtained by ordering SMN-13 from Central Supply.

EDGAR H. NELSON
Associate Deputy Chief
for Technology

DIST: SMN-13

ghd ?893Kgha 7CAA

i gNK3gMg 7CC7 góff a ywfiuéfw bó y

dt

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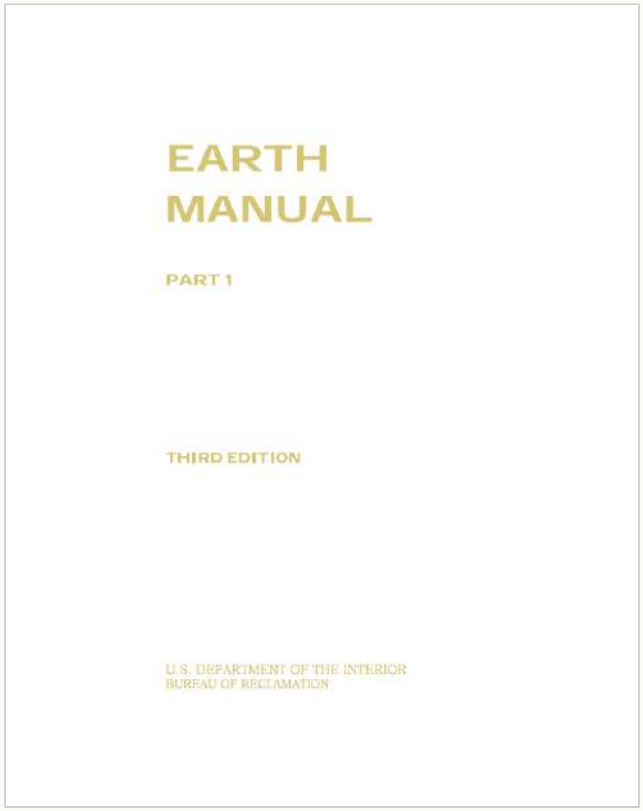
i gLf Ou fi a ué u"2du T27CC7

hu ..uéflu f yzy yéwy a ué u"2866C



DISPERSIVE SOILS *and their* MANAGEMENT

Technical Reference Manual

Sustainable Land Use
Department of Primary Industries and Water

Tasmania

ea

Puffyx Muéu” Yfëfë“ uéx gfë• Só”y óé fiy O…vué•…yé fë a ó“ fiué T ff u fŏé d ó–yw2Tué .dfió ó Df ufifl..fly u”48677/ hfiy Muéu” u 8B•…”ŏé“ uéx wó…..uéx u yu 7?2666 fiu4

O ffy fyéwy ózc fiy Mó é fy

f ufifl..flS42Kvvu fluéx gfiué fu S486774Kffff”fwu fŏé óz“ yó…y…v uéy ó wóé ó” ffffffë“ óz uéx óff éxy wóéwy y wuéu” ”fëfë“ .Mu y x Da ó“ fiué T ff u fŏéé d ó–yw2Tué/4Uŏ éu” ózT ff u fŏé uéx N ufëu“ y ?6D996399A4

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Mu u ófffiflwPuffl y ózS y wu Nu..2gffuflé28667

O ffy flyéwy zó...c fiy Mó é fly

R fl y y u”4.8669/4Mu y óz fiy wu u ófffiflwzuffl y ózué yu fi xu...v ff óé “ ff fly ó u”” fl ...uéx xfl ffy fl y w’u .K”ó flw é2S y wu d ó fléwy2b Ogffuflé/EOé flóé...yé u” Ryó”ő“ .8669/ : 9DB: 8 B; 7

Figure 10. 'Pitting & pocketing', resulting from topsoil removal, surface water has dissolved through the soil surface. Soils derived from Triassic Sandstone.

Figure 28. Rill and tunnel erosion caused by excavation of sodic soils for road construction. Dunalley.

O ffy fyéwy zó...ó fiy wó é fy 4

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k fiu u y Nfl ffy fl y góff l

DEFINITION

Dispersive clays differ from ordinary, erosion resistant clays because they have a higher relative content of dissolved sodium in the pore water. Dispersive clays have a preponderance of sodium in the pore water, whereas ordinary clays have a preponderance of calcium and magnesium cations. Dispersive clays erode as the individual colloidal clay particles go into suspension in practically still water, whereas considerable velocity in the eroding water is required to erode normal clays.

Standard soil mechanics tests, such as mechanical grain size distribution analyses (gradation) and Atterberg limit tests, do not distinguish dispersive clays from ordinary clays. A special group of tests is needed to identify dispersive clays.

Yuvó u ó hy

M ...v

Nó v"y S x ó...y y

dfëfió"y

Mfiy...fwu" hy óé dó y k u y O uw

f yzDi gNK3gMg 7OC7 góff a ywfiuéfw b ó y

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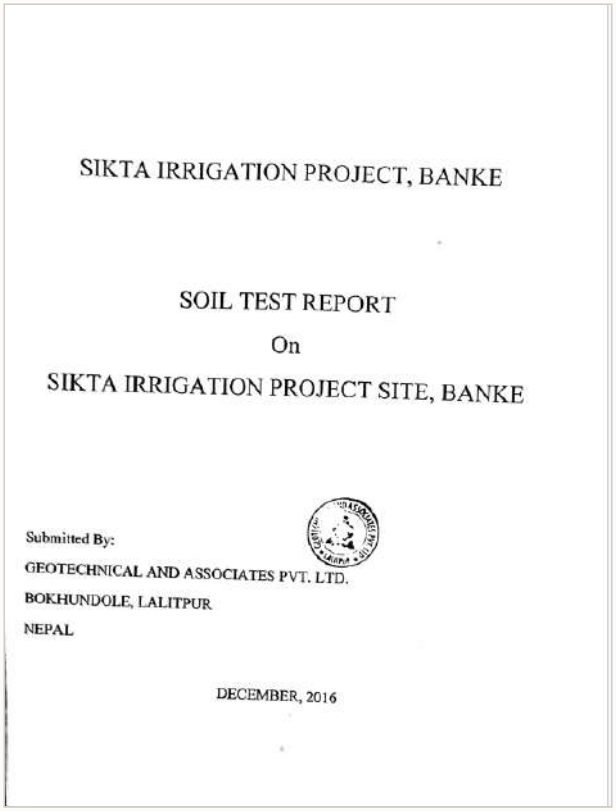

SIKTA IRRIGATION PROJECT, BANKE

SOIL TEST REPORT

On

SIKTA IRRIGATION PROJECT SITE, BANKE

Submitted By:

GEOTECHNICAL AND ASSOCIATES PVT. LTD.

BOKHUNDOLE, LALITPUR

NEPAL

DECEMBER, 2016

Table 3 - Summary of Double hydrometer test results

S. No.	Sampling Locations	Soil Dispersion in %	Remarks
1	Chainage (17+407)	55.88	Dispersive
2	D/s of Paruwa aqueduct, right side (19+900)	35.41	Intermediate
3	Balapur deep cutting area (21+221)	42.5	Intermediate
4	Chainage 22+757	56.44	Dispersive
5	Dhakeri village, u/s: disturbed, left side (23+207)	29.1	Non dispersive
6	Dhakeri village, right side (23+996)	45.55	Intermediate
7	Jhijhari River (Right bank: probable soil quarry site)	11.32	Non-Dispersive
8	Jhijhari deep cutting (26+435)	58.75	Dispersive
9	Jhijhari aqueduct downstream (26+124)	58.46	Dispersive
10	Highly disturbed part: 1 (27+773)	48.78	Intermediate
11	Highly disturbed part: 2 (31+207)	60.64	Dispersive
12	Chandi Bhagra Aqueduct, u/s right side (31+670)	43.26	Intermediate
13	Dunduwa filling(34+175)	57.14	Dispersive
14	Sidhanta around (1+500)	33.33	Intermediate

hy f y ” fé“ Nó v”y S x ó…y y hy

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O uv”fl fiyx k u y f ff fi fĺé fiy k y f uff flf fl y
a óxy” fl ff u fŏé ff ó–yw zó ó fiy ”u “ y ff ó–yw ”fl•y a ufiu•u”f2f uéflUu…u u W ”u fl u2L fiy fŏ1 uvuf2g é•ó fifla u fĺé
Nfl y fŏé y w4
Oéfiuéwyx hywfiéfŀwu” Muffuwfl óz fiy b u fŏé .O…ff”ó y 2Móé uwó uéx fiy Móé ”ué /
O uv”fl fiyx …uéxu ó y zó xfl ffy fl y óff fĺé fl ff u fŏé ff ó–yw 4k ff” u” ó yzy yéwy zó f óux2h ué …fl fŏé ”fĺéy2
x ufĺéu“ y uéx óff fŀwu” v y wuv”y yéwfi
Mu y x zó “ yóffó”flfŀw 2Oé“ fĺéyy fĺé“ 2uéx ówfŏ3ywóéó…fŀwwfiu”ýé“ y óz fiy u y y ó wy .wóé …ff fl y y/
ff ó–yw fĺé b yffu”
Tewyu yx wóé xyéwy2 y”z y”fluéwy2uéx xff éfl óz fiy b u fŏé

en

gfl u T ff u fbé Syux ó • uéx a ufé Muéu”

hfiué• ó !