Public Notice

U S Army Corps
of Engineers
Huntington District

In reply refer to Public Notice No.
200400574-1
Stream: **UN TRIB CABIN CREEK**

Issuance Date:
June 14, 2005
Closing Date:
July 14, 2005

Please address all comments and inquiries to:
U.S. Army Corps of Engineers, Huntington District
ATTN: CELRH-OR-F Public Notice No. *(reference above)*
502 Eighth Street
Huntington, West Virginia 25701-2070
Phone: (304) 399-5210

PUBLIC NOTICE: The purpose of this public notice is to inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest. We hope you will participate in this process.

REGULATORY PROGRAM: Since its early history, the U.S. Army Corps of Engineers (Corps) has played an important role in the development of the nation's water resources. Originally, this involved construction of harbor fortifications and coastal defenses. Later duties included the improvement of waterways to provide avenues of commerce. An important part of our mission today is the protection of the nation's waterways through the administration of the Corps Regulatory Program.

SECTION 404: The Corps is directed by Congress under Section 404 of the Clean Water Act (33 USC 1344) to regulate the discharge of dredged and fill material into all waters of the United States, including wetlands. The intent of the law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution and to restore and maintain their chemical, physical and biological integrity.

TO WHOM IT MAY CONCERN: The following application has been submitted for a Department of the Army Permit under the provisions of Section 404 of the Clean Water Act. This notice serves as the Corps of Engineers' request to the West Virginia Department of Environmental Protection (WVDEP) to act on Section 401 Water Quality Certification for the following application:

APPLICANT: Hanna Land Company
Post Office Box 2814
Charleston, West Virginia 25330

LOCATION: The proposed project is located in unnamed tributaries of Cabin Creek and Long Branch of Fifteenmile Fork approximately 2.36 miles northeast of Ameagle in Kanawha, Fayette, and Raleigh, West Virginia as depicted on the attached Figure 1.

DESCRIPTION OF THE PROPOSED WORK: The applicant proposes to place fill material into waters of the United States in conjunction with the construction of three valley fills and two sediment ponds associated with the Republic No. 2 Surface Mine. According to the applicant, the purpose of the project is to construct valley fills to dispose of excess overburden spoil generated by surface mining operations into waters of the United States in order to achieve optimal recovery of available coal reserves within the project area and to provide the mandatory sediment control and access.

The proposed surface coal mining activities were previously advertised by Public Notice 200400574 issued by this office on August 30, 2004. The notice stated a total of 8,556' of intermittent stream channel and 254' of ephemeral stream channel would be permanently and temporarily impacted by the proposed surface coal mining activities. Since that time, information has been provided to this office regarding the presence of additional intermittent and ephemeral stream channels at the site. It has been determined an additional 1,039' of intermittent stream channel and 2,845' of ephemeral stream channel would be permanently and temporarily impacted as a result of the proposed coal mining activities.

The construction of the proposed valley fills would result in the permanent discharge of fill material into approximately 9,918' (1.01 acres) of seven jurisdictional stream channels. Of this total, approximately 6,819' of intermittent stream and 3,099' of ephemeral stream would be impacted. The construction of the three sediment ponds would result in the temporary discharge of fill material into 2,200' (0.28 acre) of intermittent stream channel. Approximately 576' (0.41 acre) of intermittent stream channel would be impacted by sediment transport activities. A total of 12,694' (1.71 acres) of waters of the United States would be impacted by the proposed surface coal mining activities. Tables A and B of this public notice provides additional information regarding the proposed impact sites and watershed acreages.

The West Virginia Department of Environmental Protection (WVDEP) issued the required Surface Mining Permit (S-3001-01) on October 6, 2003 and the required NPDES permit (WV1019422) on October 7, 2003.

MITIGATION PLAN: In order to compensate for the permanent loss of approximately 9,918' (1.01 acre) of intermittent and ephemeral stream channel, the applicant proposes off-site mitigation. Off-site mitigation would consist of the restoration and enhancement activities on perennial and intermittent reaches of approximately 10,777' of Long Branch, a tributary of Fifteenmile Creek near Decota, Kanawha County, West Virginia. The proposed restoration and enhancement activities on Long Branch would include the installation of habitat and in-stream structures to improve overall epifaunal substrate and cover for benthic and fish species. Proposed structures would include green gabions, vegetated rip-rap, and large woody debris to stabilize the streambanks as well as boulders and j-hook vanes to further protect the streambanks and provide scouring pools. Approval of this request would be contingent upon actual completion of the restoration/enhancement activities within the stream channels, concurrence of the commenting agencies, and analysis of quality, functions, and values of resources lost at the impact site as compared to quality, functions, and values of resources gained at the mitigation sites. The

applicant is aware that utilization of the restored/enhanced stream channels may not be acceptable as sole compensation for permanent impacts associated with the mining activities. Figure 13 depicts the geographic relationship between the proposed impact sites and the proposed mitigation site. Figures 14-14C more fully describes the components of the off-site mitigation.

To compensate for temporary impacts to 2,776' of intermittent stream channel associated with construction of three sediment control structures, the applicant proposes to restore each stream channel to its pre-mining conditions. Stream surveys have been conducted for each stream channel proposed for impact to ensure restoration based on original stream habitat parameters and physical dimensions. Upon completion of mining activities and upon release of the Phase II bond, restoration activities would take place. All restoration activities would take place during low-flow periods. The sediment pond would be dewatered and immediately seeded and mulched to stabilize the area. A two-stage channel would be constructed based on the pre-mining physical dimensions. In-stream habitat structures, such as boulders, root-wads, logs, would be added to the stream channel. A 50-foot riparian buffer, 25' on each side of the stream, would be established along the restored stream channels. The vegetated buffer would include the following species: reed canary grass, orchard grass, redtop grass, millet grass, bankers dwarf willow, purpleozier willow, silky dogwood, smooth alder, arrowwood viburnum, spicebush, yellow poplar, sycamore, silver/red maple, black walnut, and red oak. Figures 12a-12g depicts the proposed stream restoration activities.

All restored stream channels will be monitored for a five year period.

Plans of the proposed work are attached to this public notice.

A Section 401 Water Quality Certification is required for this project. It is the applicant's responsibility to obtain the certification from the West Virginia Department of Environmental Protection.

HISTORIC AND CULTURAL RESOURCES: The National Register of Historic Places (NRHP) has been consulted and it has been determined there are no properties currently listed on the register that are in the area affected by the project. A copy of this public notice will be sent to the State Historic Preservation Office for their review. Comments concerning archeological sensitivity of a project area should be based upon collected data.

ENDANGERED/THREATENED SPECIES REVIEW: The project is located within the known or historic range of the Indiana bat, a federally listed endangered species. The applicant has provided information to the United States Fish and Wildlife Service regarding Indiana bat summer roosting habitat within the proposed mining area. Based on the amount of habitat within the mining area, the applicant has proposed to conduct seasonal clearing during the period between November 15 and March 31. This public notice serves as a request to the U.S. Fish and Wildlife Service for any additional information they may have on whether any listed or proposed to be listed endangered or threatened species may be present in the area which would be affected by the activity, pursuant to Section 7(c) of the Endangered Species Act of 1972 (as amended).

PUBLIC INTEREST REVIEW AND COMMENT: Any person who has an interest that may be adversely affected by the issuance of a permit may request a public hearing. The request must be submitted in writing to the District Engineer on or before the expiration date of this notice and

must clearly set forth the interest which may be adversely affected and the manner in which the interest may be adversely affected by the activity. This application will be reviewed in accordance with 33 CFR 320-331, the Regulatory Program of the U. S. Army Corps of Engineers (USACE), and other pertinent laws, regulations, and executive orders. Our evaluation will also follow the guidelines published by the U. S. Environmental Protection Agency pursuant to Section 404(b) (1) of the CWA. Interested parties are invited to state any objections they may have to the proposed work. The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit that reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors that may be relevant to the proposal will be considered including the cumulative effects thereof; of those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people. Written statements on these factors received in this office on or before the expiration date of this public notice will become a part of the record and will be considered in the final determination. A permit will be granted unless its issuance is found to be contrary to the public interest.

SOLICITATION OF COMMENTS: The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. For accuracy and completeness of the administrative record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

CLOSE OF COMMENT PERIOD: All comments pertaining to this Public Notice must reach this office on or before the close of the comment period listed on page one of this Public Notice. If no comments are received by that date, it will be considered that there are no objections. Comments and requests for additional information should be submitted to:

Kimberly Courts-Brown, Regulatory Project Manager
North Regulatory Section, CELRH-OR-FN
U. S. Army Corps of Engineers Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070.

Please note names and addresses of those who submit comments in response to this public notice may be made publicly available. Thank you for your interest in our nation's water resources. If you have any questions concerning this public notice, please contact Kimberly Courts-Brown of the North Regulatory Section at 304-399-5210.

Ginger Mullins, Chief
Regulatory Branch

(WV)

Table A
Hanna Land Company LLC.
Republic No. 2 Surface Mine
Jurisdictional Waters Impact Summary

Structure	Permanent Intermittent feet	acres	Permanent Ephemeral Feet	Acres	Temporary Intermittent feet	acres	Temporary Ephemeral feet	acres	Secondary Intermittent feet	Acres	Secondary Ephemeral feet	acres
Valley Fill No. 1 Ponds 1/A & 1/B												
UN Trib Cabin Creek	2170'	0.253	480'	0.043	1400'	0.208						
1st Right Fork	200'	0.011	456'	0.046	0'	0						
2nd Right Fork	212'	0.019	573'	0.056	0'	0						
3rd Right Fork	775'	0.046	280'	0.048	0'	0						
Valley Fill No. 2												
UN Trib Cabin Creek	1190'	0.123	693'	0.077					325'	0.370		
Valley Fill No. 3												
Pond 2												
Long Branch	2272'	0.237	272'	0.014	800'	0.080			251'	0.036		
1st Right Fork	0	0.000	345'	0.041	0	0.000			0	0.000		
PERMANENT & TEMPORARY TOTAL	**6819'**	**0.689**	**3099'**	**0.325**	**2200'**	**0.288**			**576'**	**0.406**		

Table B

Hanna Land Company LLC.
Republic No. 2 Surface Mine
Affected Drainage Areas

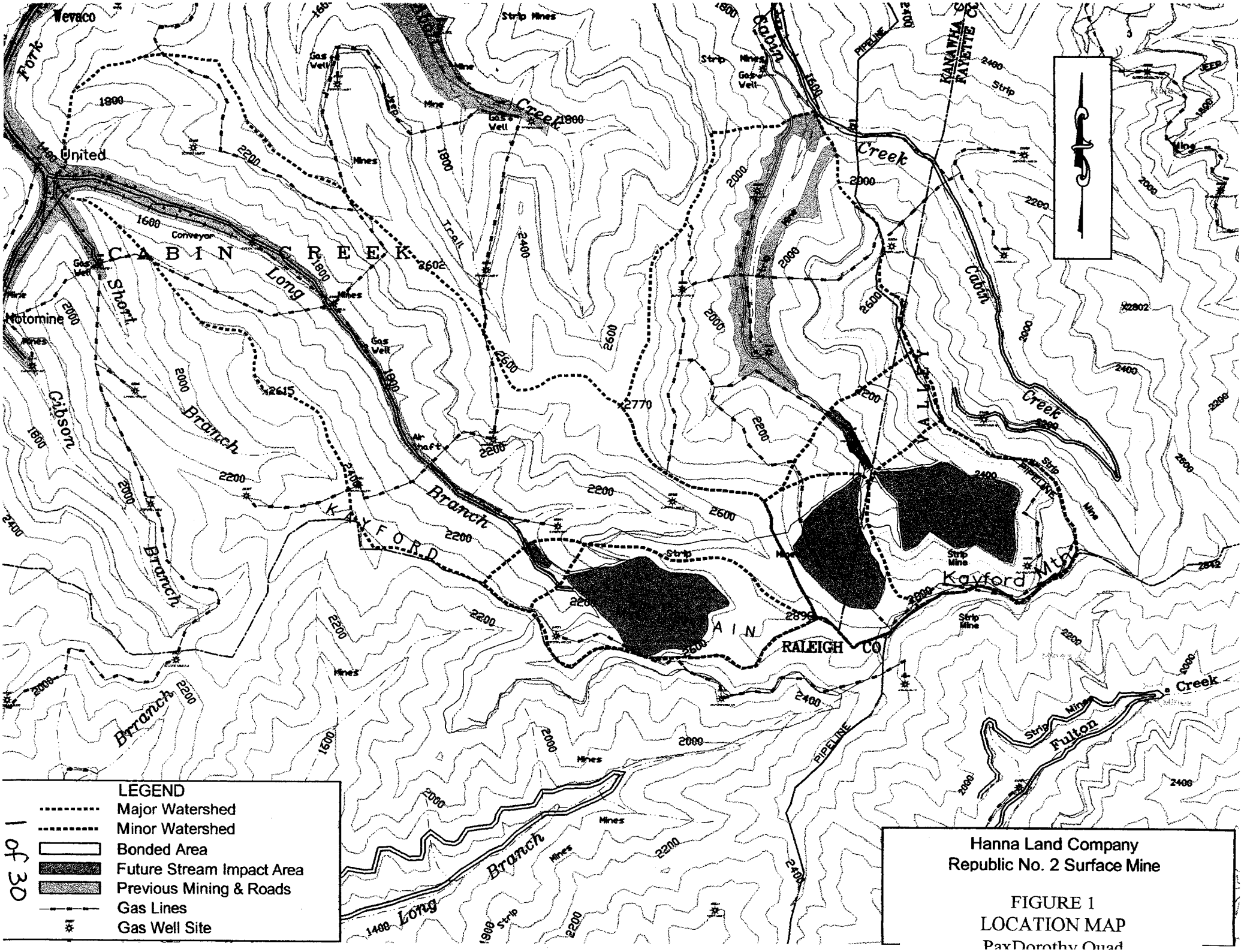
Disposal Site	Drainage Area Fill Toe (acres)
Valley Fill 1	189.95
Valley Fill 2	102.33
Valley Fill 3	140.43
	432.71

Table C
Hanna Land Company LLC
Republic No. 1 Surface Mine
Total Fill Volume/Valley Fill Disposal Site

Disposal Site	Fill Volume Cubic Yards
Valley Fill 1	16,869,843
Valley Fill 2	9,574,303
Valley Fill 3	19,199,701
Total	**45,643,847**

Table D
Hanna Land Company LLC
Republic No. 2 Surface Mine
Mining and Reclamation Schedule

PHASE	START Month	END Month	MINED ACRES	RECLAIMED ACRES
I	0	13	167.3	0
II	14	48	182.55	60.61
III	49	87	189.15	165.95
IV	88	116	100.66	155.53
V	117	144	113.61	171.44
VI	145	157	0	199.73



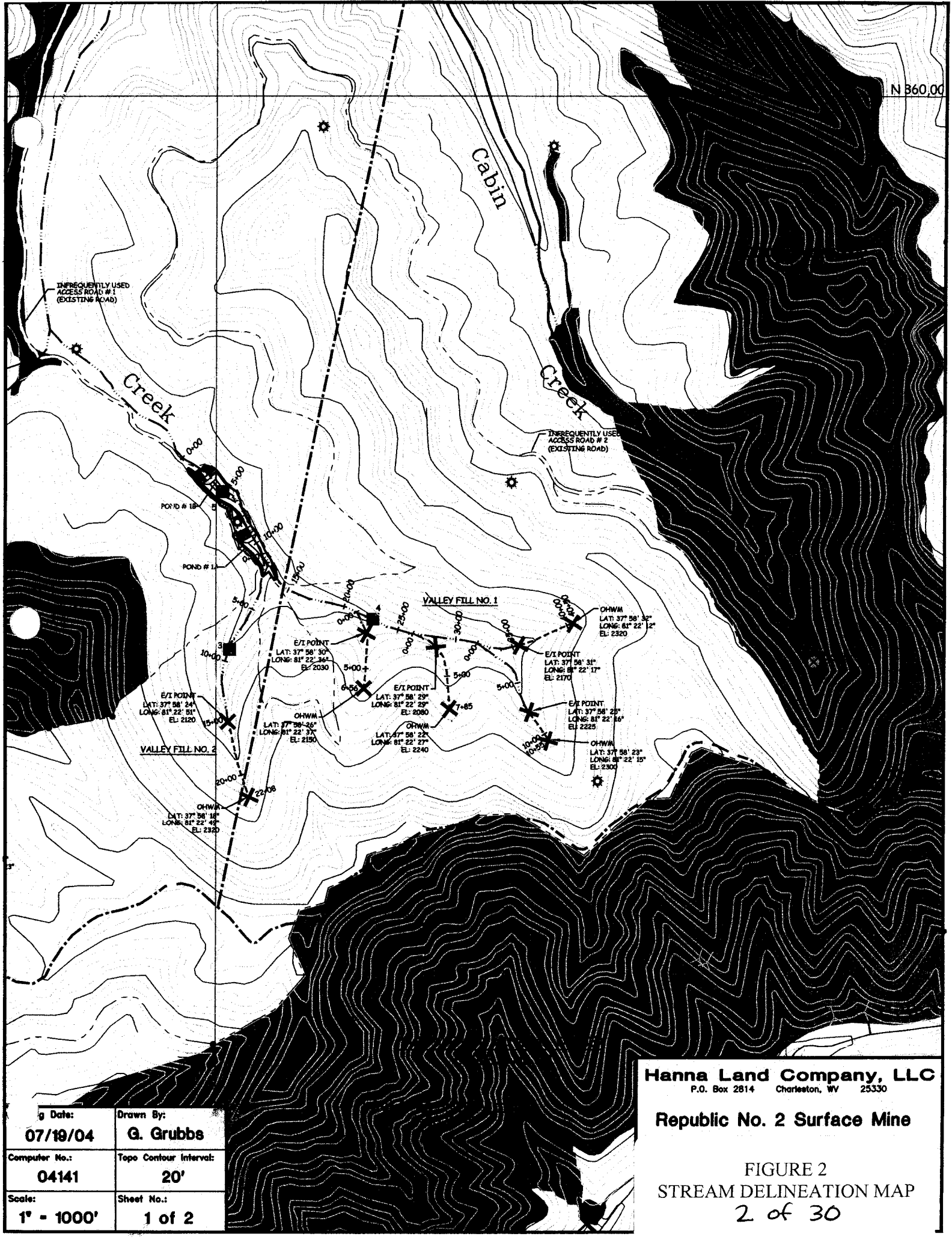
LEGEND

- Major Watershed
- Minor Watershed
- Bonded Area
- Future Stream Impact Area
- Previous Mining & Roads
- Gas Lines
- Gas Well Site

1 of 30

Hanna Land Company
Republic No. 2 Surface Mine

FIGURE 1
LOCATION MAP
PaxDorothy Quad

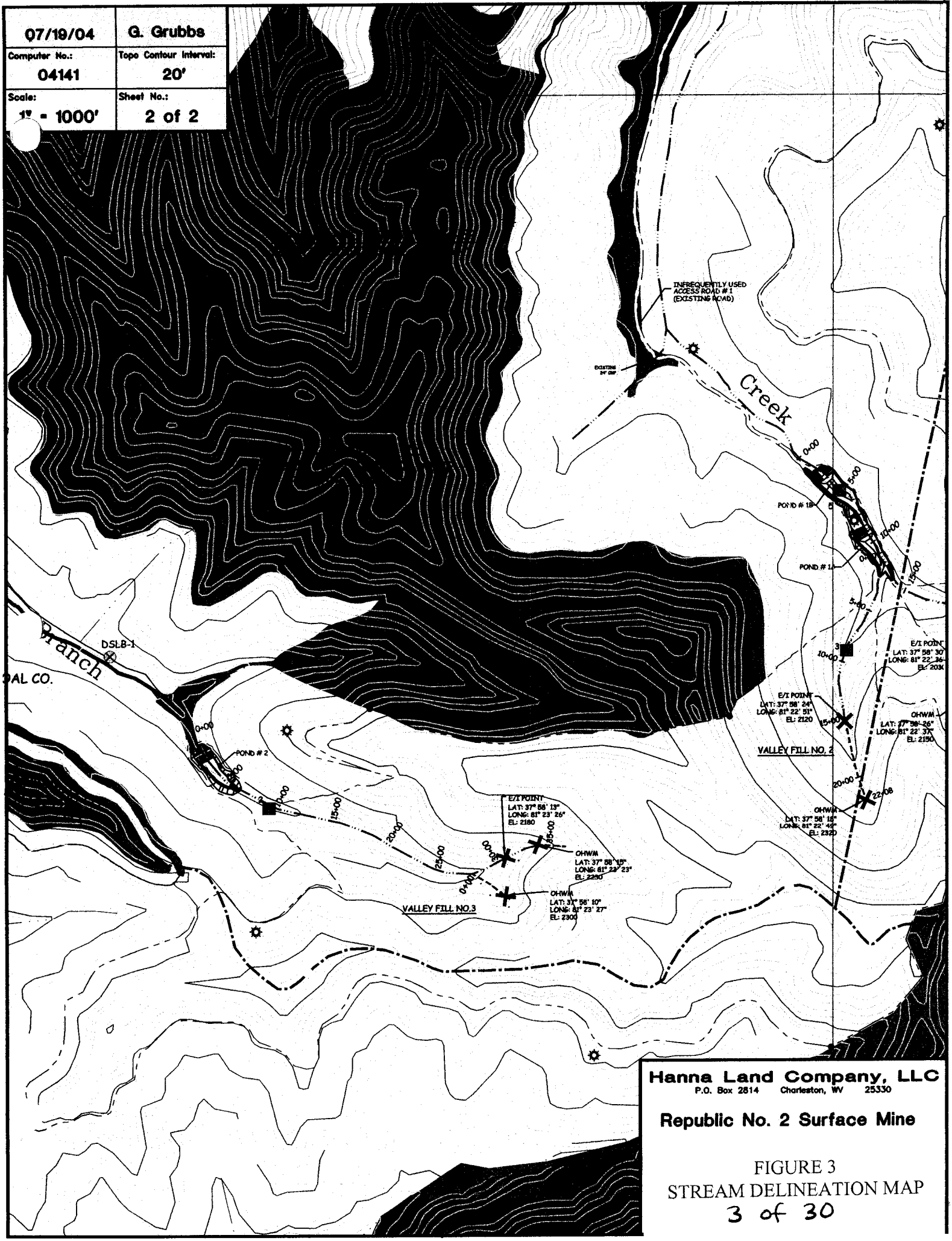


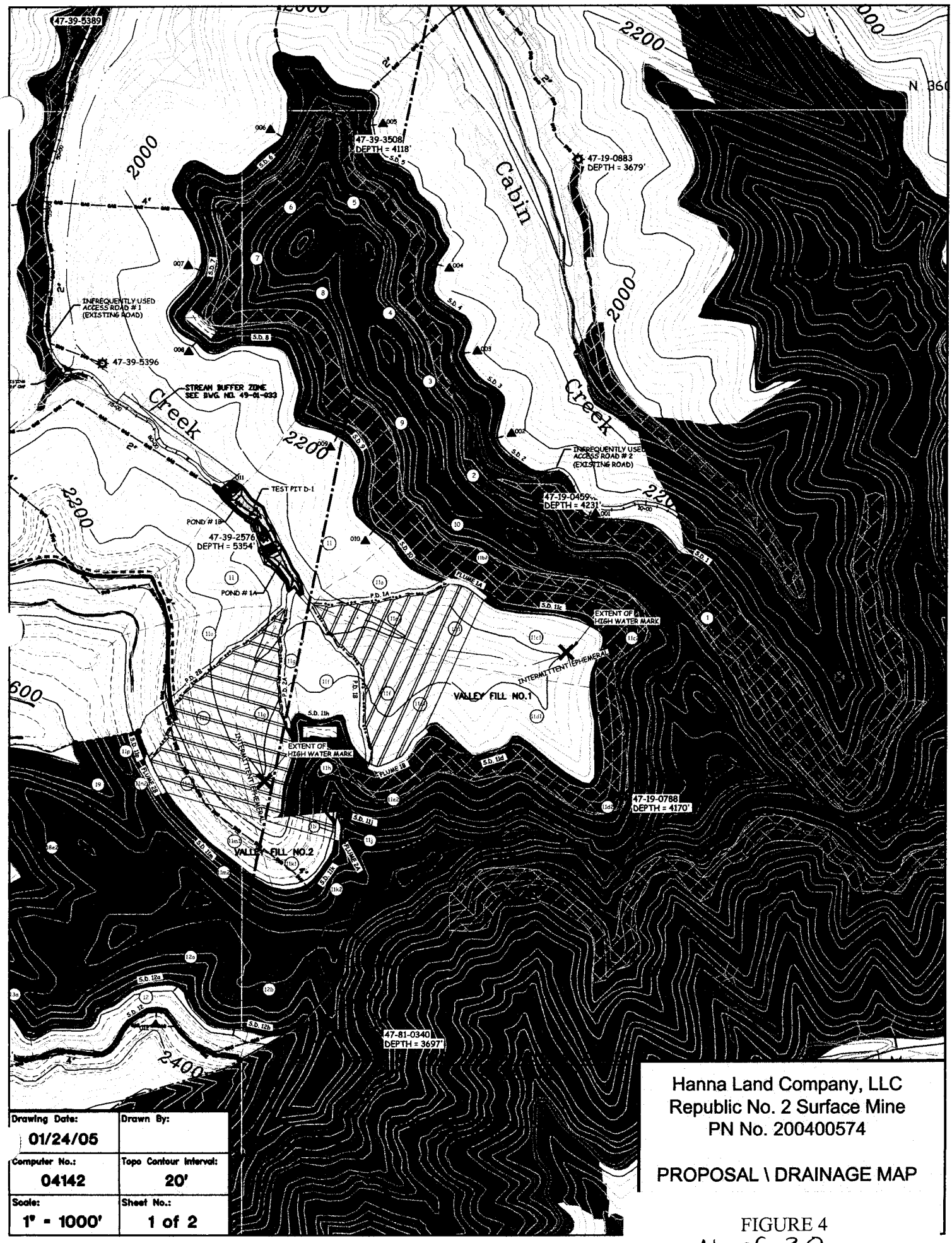
g Date:	Drawn By:
07/19/04	G. Grubbs
Computer No.:	Topo Contour Interval:
04141	20'
Scale:	Sheet No.:
1" = 1000'	1 of 2

Hanna Land Company, LLC
P.O. Box 2814 Charleston, WV 25330

Republic No. 2 Surface Mine

FIGURE 2
STREAM DELINEATION MAP
2 of 30


07/19/04
G. Grubbs
Computer No.:
04141
Topo Contour Interval:
20'
Scale:
1" = 1000'
Sheet No.:
2 of 2
INFREQUENTLY USED ACCESS ROAD # 1 (EXISTING ROAD)
EXISTING 24" CMP
Creek
POND # 1B
POND # 1
POND # 2
DSLB-1
Branch
AL CO.
E/I POINT
LAT: 37° 58' 13"
LONG: 81° 23' 26"
EL: 2180
OHWM
LAT: 37° 58' 15"
LONG: 81° 23' 23"
EL: 2250
OHWM
LAT: 37° 58' 10"
LONG: 81° 23' 27"
EL: 2300
VALLEY FILL NO.3
E/I POINT
LAT: 37° 58' 24"
LONG: 81° 22' 51"
EL: 2120
OHWM
LAT: 37° 58' 26"
LONG: 81° 22' 37"
EL: 2150
VALLEY FILL NO. 2
OHWM
LAT: 37° 58' 18"
LONG: 81° 22' 42"
EL: 2320
E/I POINT
LAT: 37° 58' 30"
LONG: 81° 22' 36"
EL: 203
Hanna Land Company, LLC
P.O. Box 2814 Charleston, WV 25330
Republic No. 2 Surface Mine
FIGURE 3
STREAM DELINEATION MAP
3 of 30



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04142	20'
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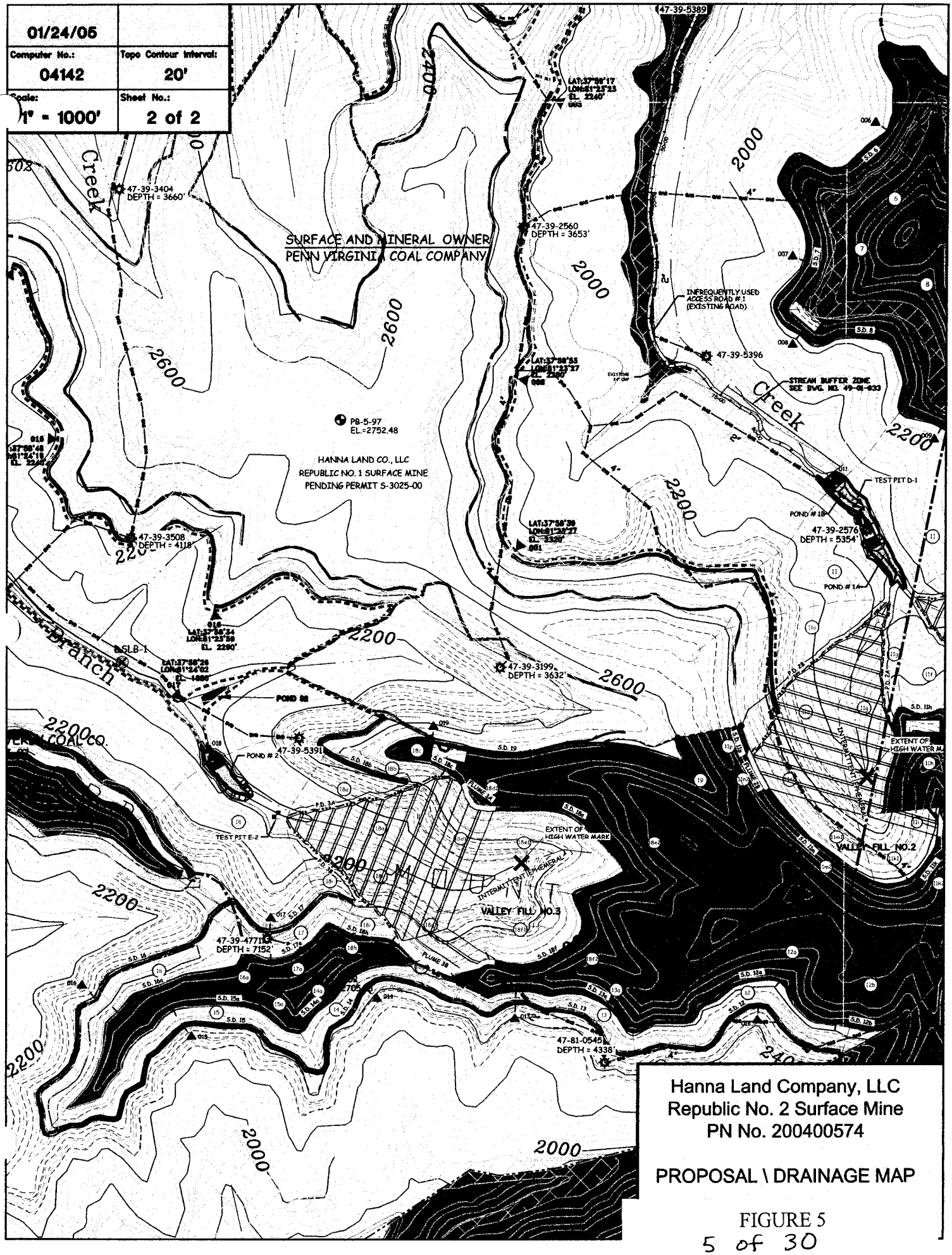
1" = 1000'	1 of 2

Hanna Land Company, LLC
Republic No. 2 Surface Mine
PN No. 200400574

PROPOSAL \ DRAINAGE MAP

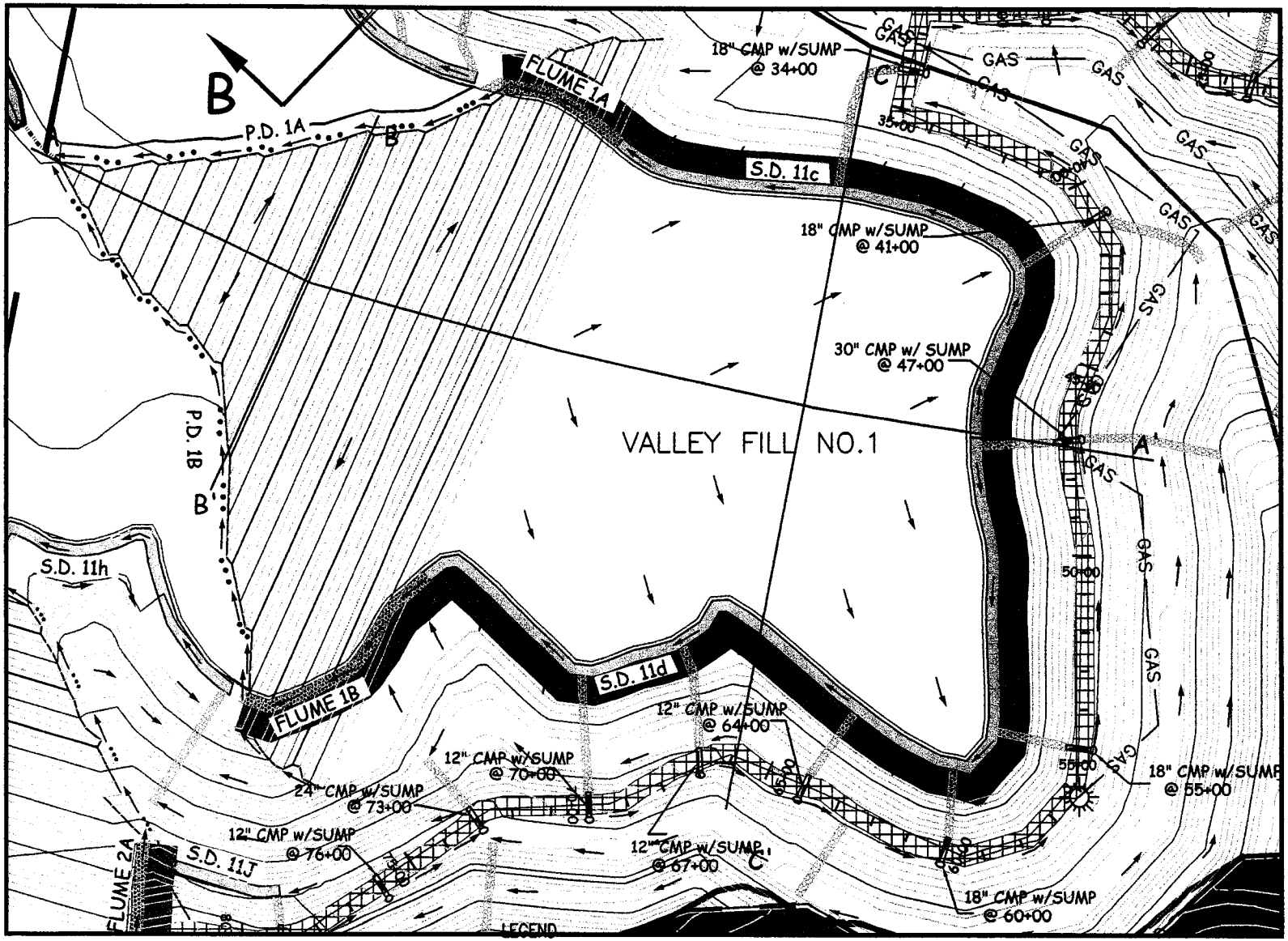
FIGURE 4



Hanna Land Company, LLC
Republic No. 2 Surface Mine
PN No. 200400574

PROPOSAL \ DRAINAGE MAP

FIGURE 5



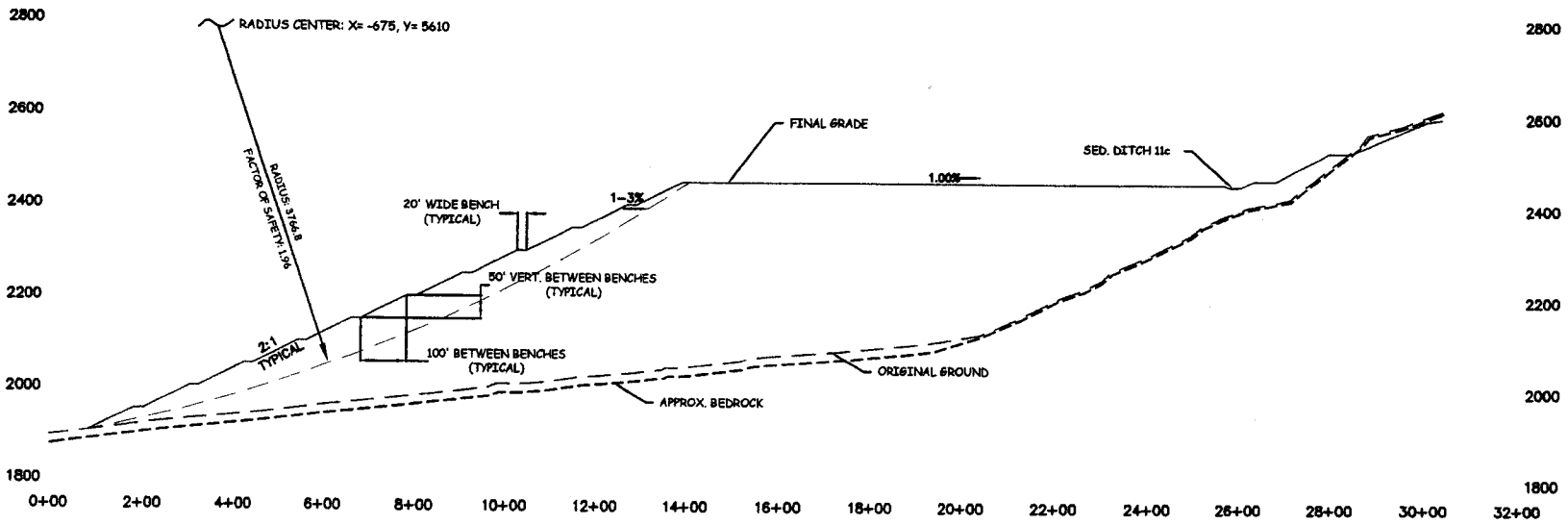
PLAN VIEW
SCALE: 1"=400'

FIGURE 6

VALLEY FILL No. 1

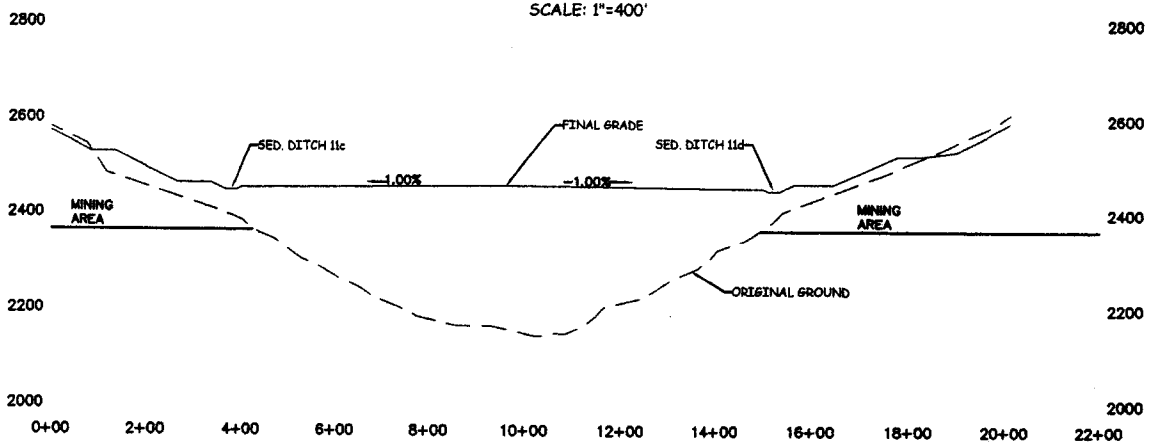
Hanna Land Company, LLC

Republic No. 2 Surface Mine



PROFILE A-A'

SCALE: 1"=400'



PROFILE C-C'

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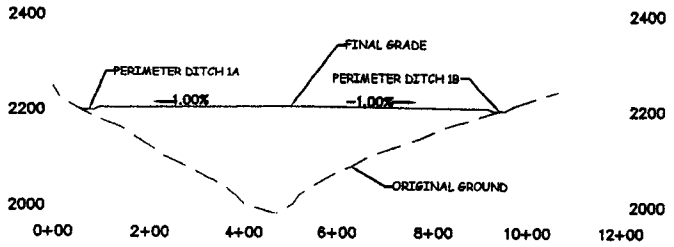

PROFILE B-B'

SCALE: 1"=400'

Legend

- Approx. Existing Ground
- Valley Fill
- Depth to Bedrock

VALLEY FILL No. 1

Hanna Land Company, LLC

Republic No. 2 Surface Mine

FIGURE 6A

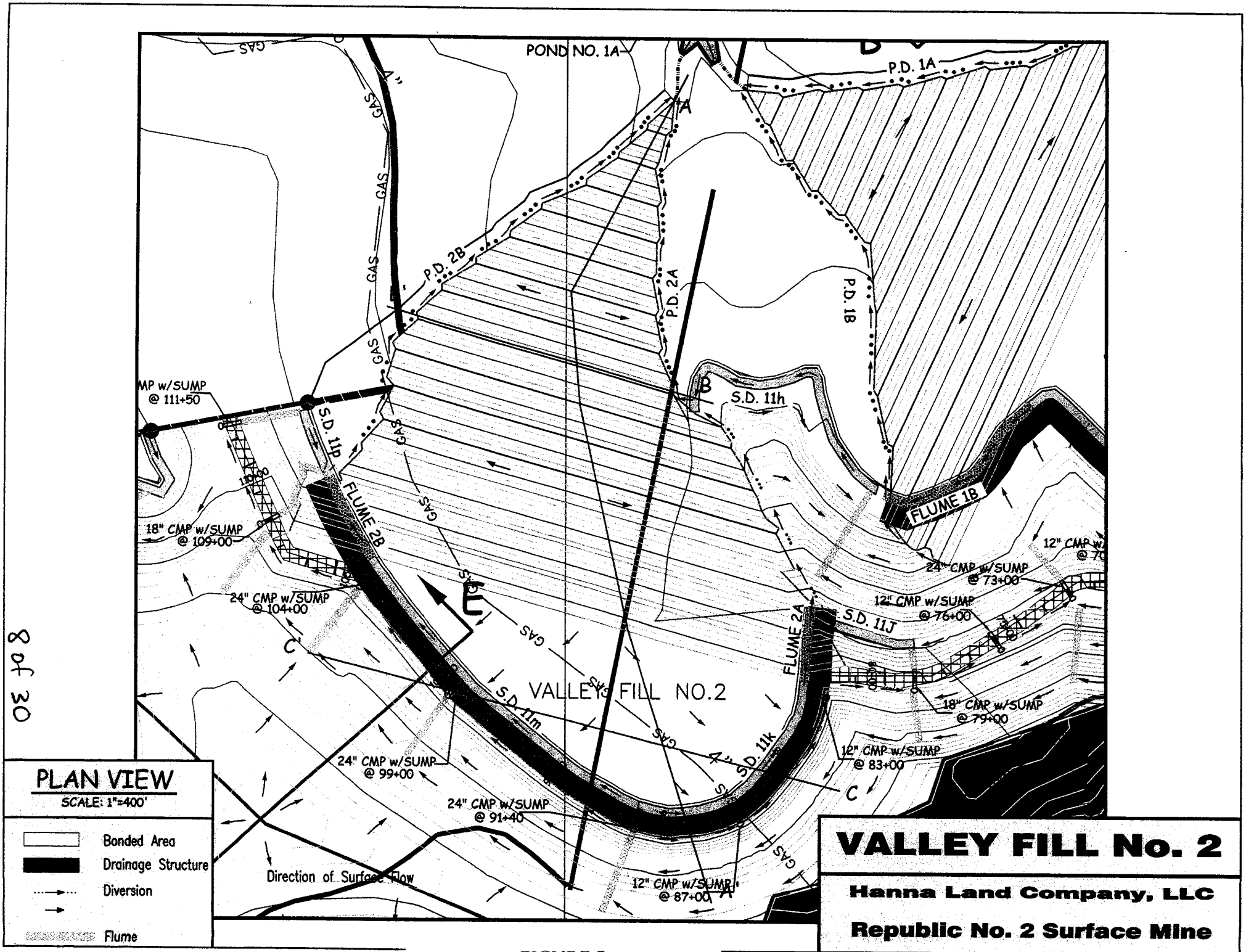

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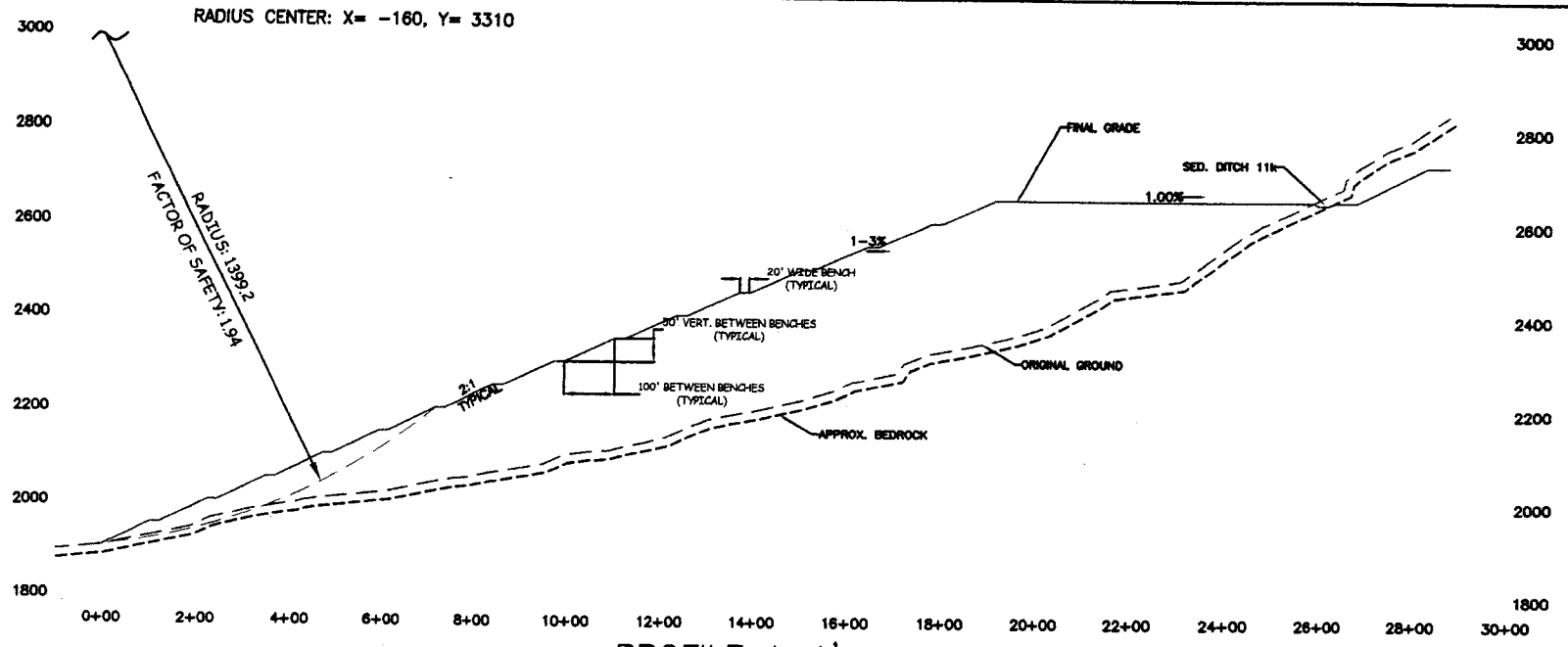
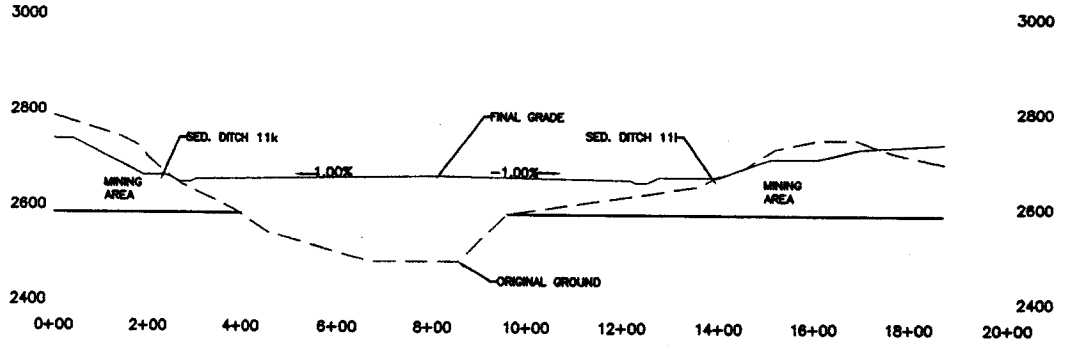
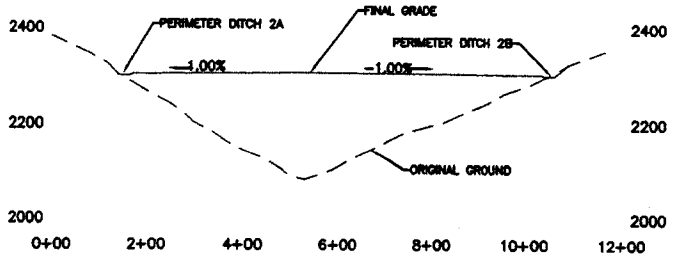
FIGURE 7



PROFILE A–A'
SCALE: 1"=400'



PROFILE C–C'
SCALE: 1"=400'



PROFILE B–B'
SCALE: 1"=400'

Legend

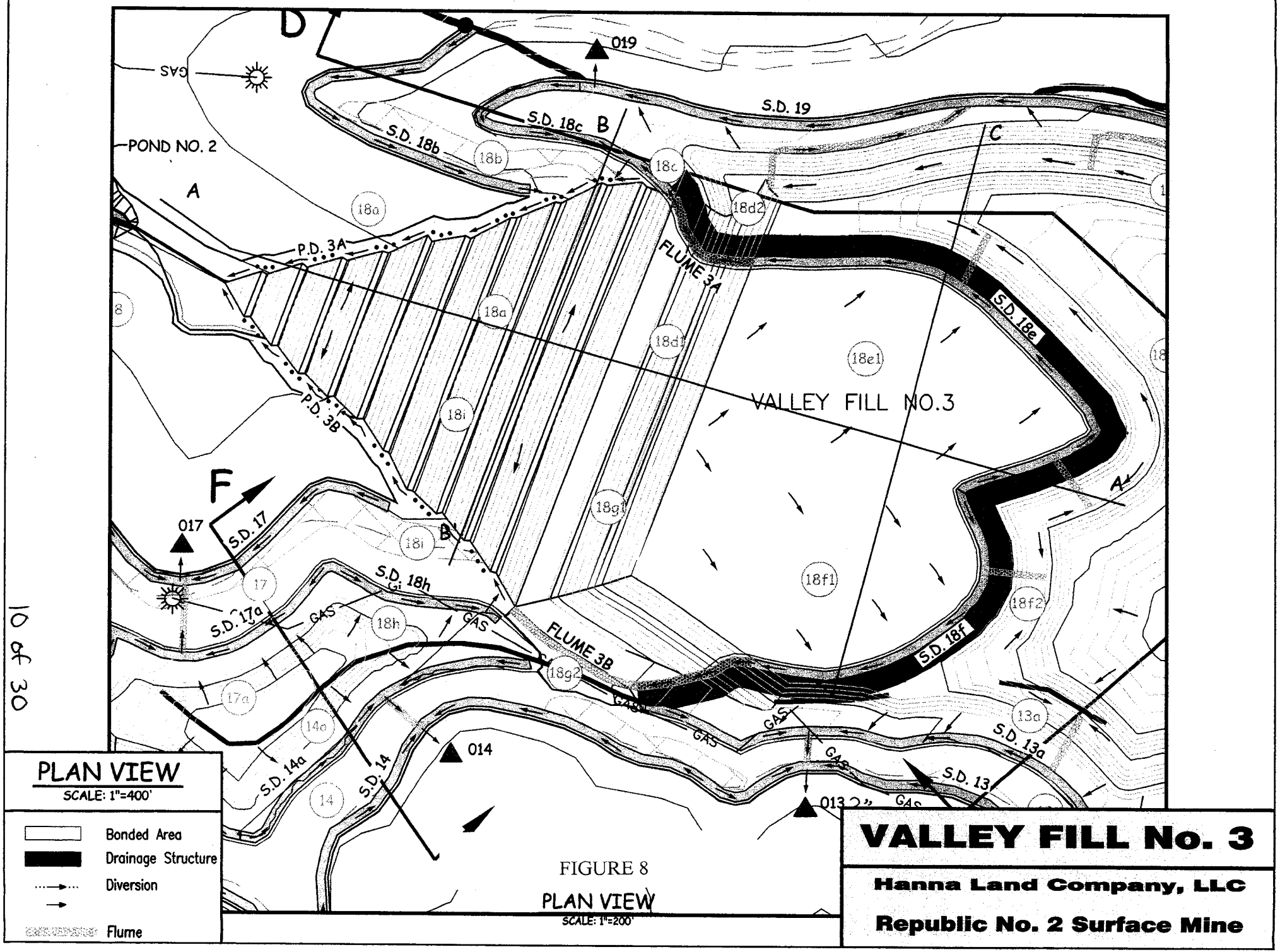
- Approx. Existing Ground
- Valley Fill
- Depth to Bedrock

VALLEY FILL No. 2

Hanna Land Company, LLC

Republic No. 2 Surface Mine

FIGURE 7A



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PLAN VIEW

SCALE: 1"=400'

- Bonded Area
- Drainage Structure
- Diversion
- Flume

FIGURE 8

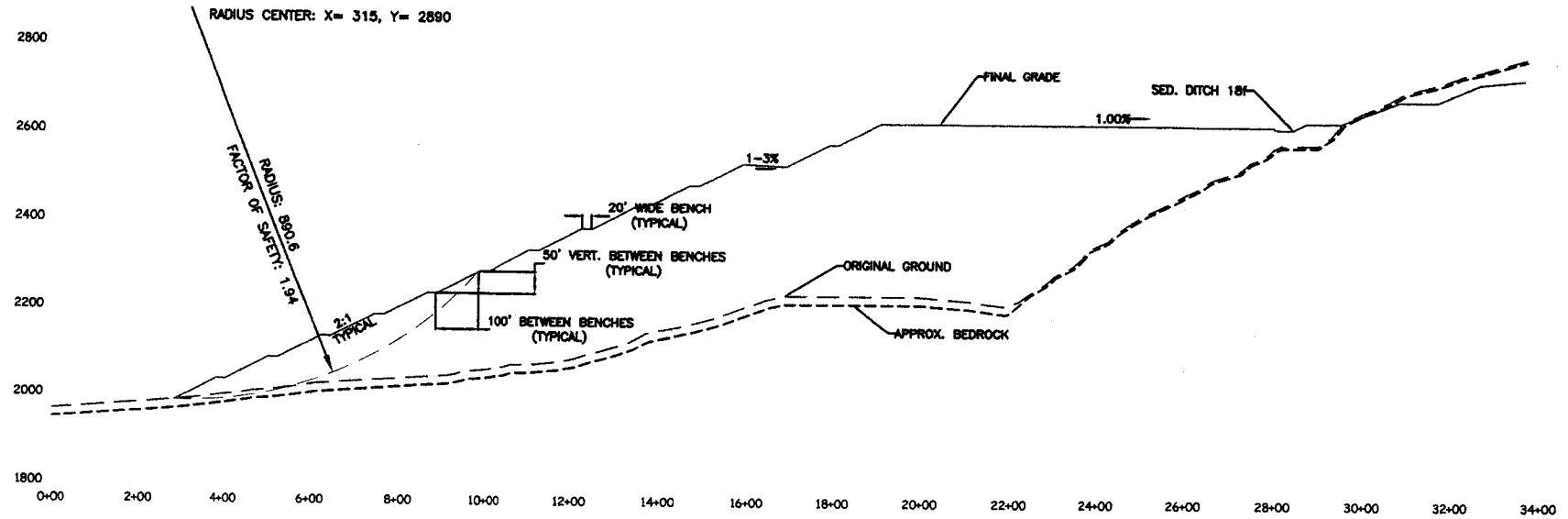
PLAN VIEW

SCALE: 1"=200'

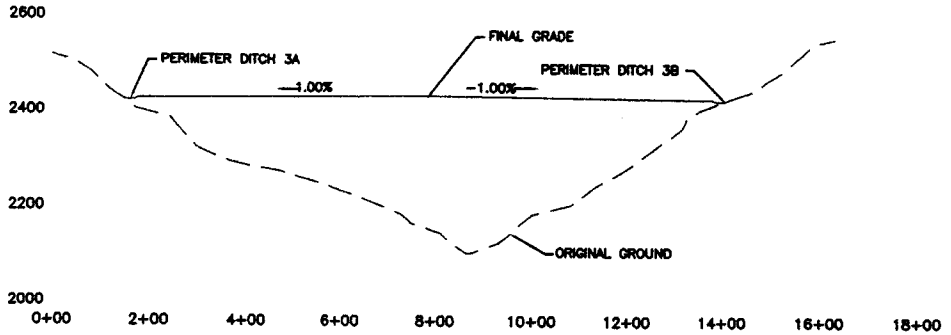
VALLEY FILL No. 3

Hanna Land Company, LLC

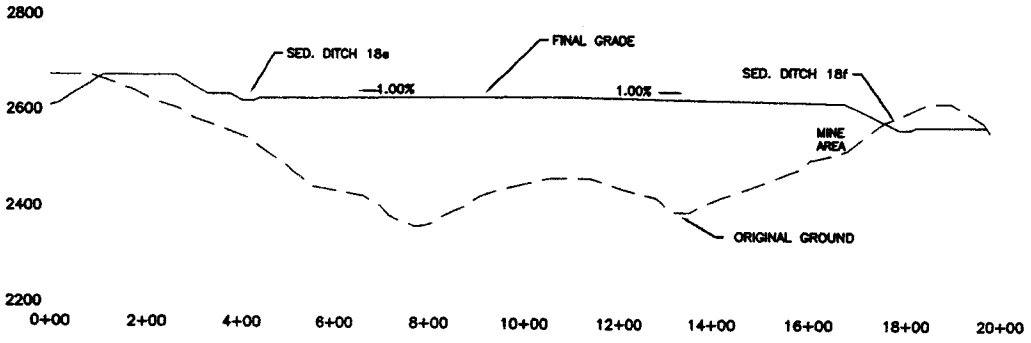
Republic No. 2 Surface Mine



PROFILE A–A'
SCALE: 1"=400'



PROFILE B–B'
SCALE: 1"=400'



PROFILE C–C'
SCALE: 1"=400'

Legend

- Approx. Existing Ground
- Valley Fill
- Depth to Bedrock

VALLEY FILL No. 3

Hanna Land Company, LLC

Republic No. 2 Surface Mine

FIGURE 8A

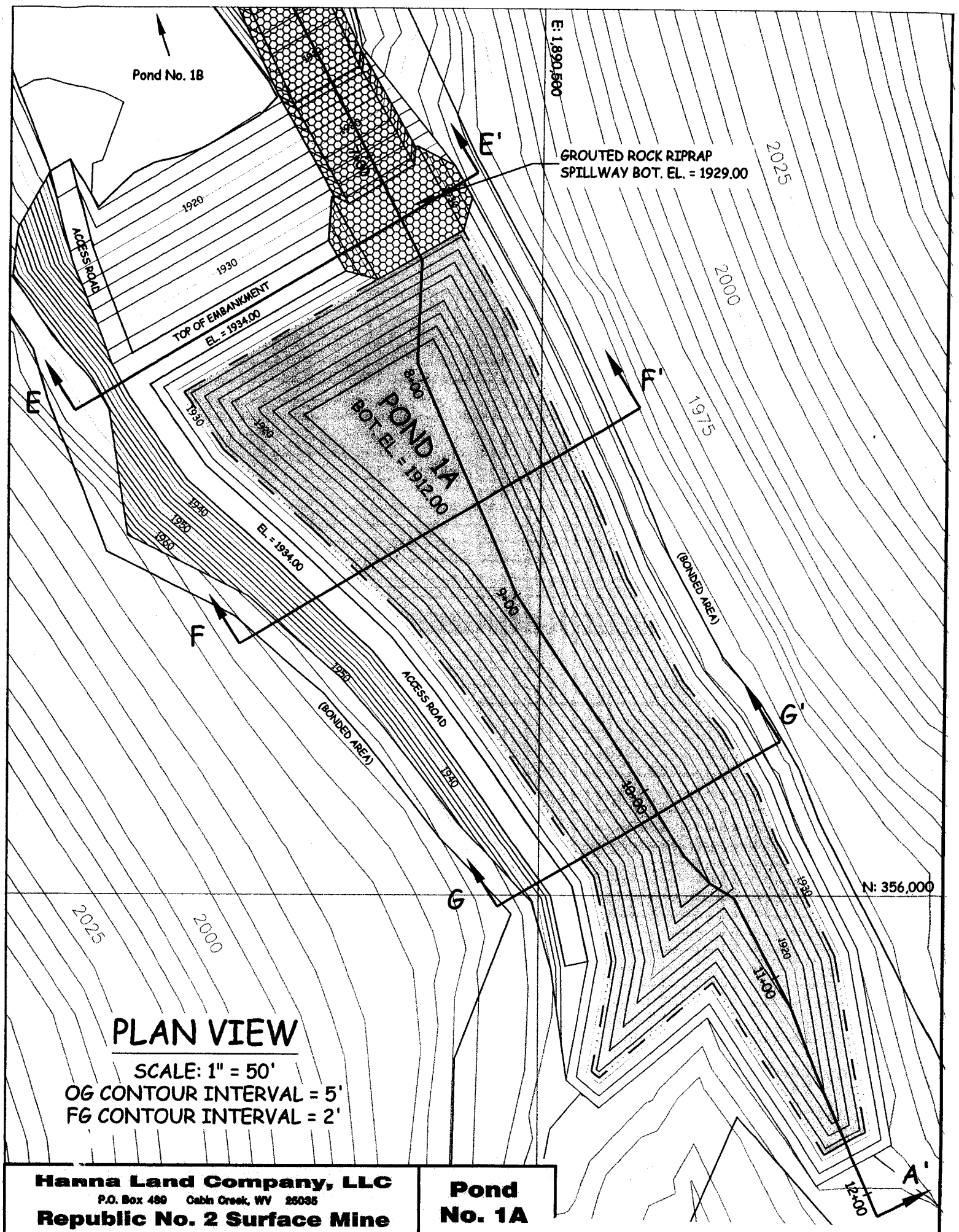
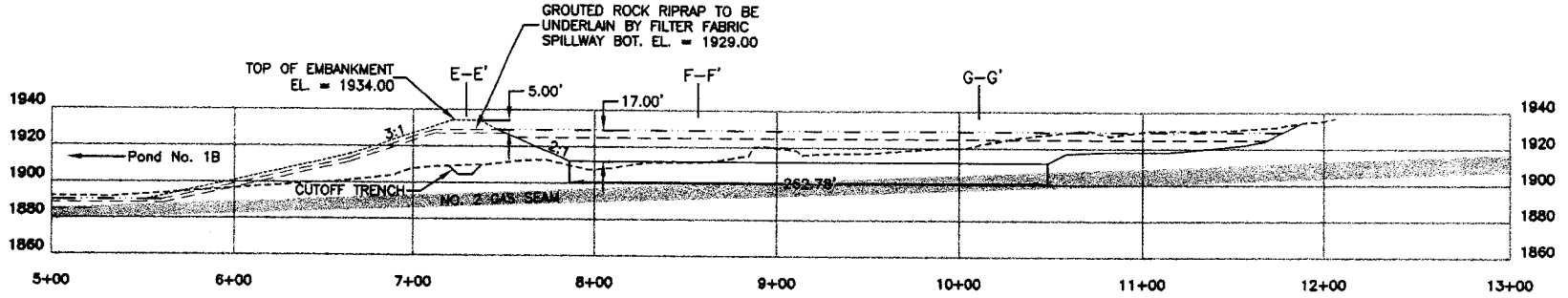
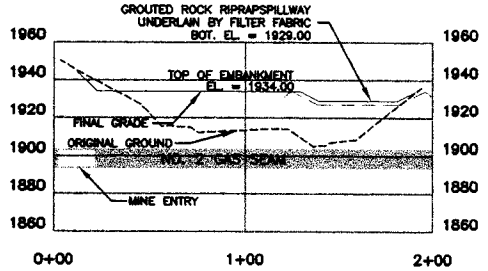


FIGURE 9 12 of 30



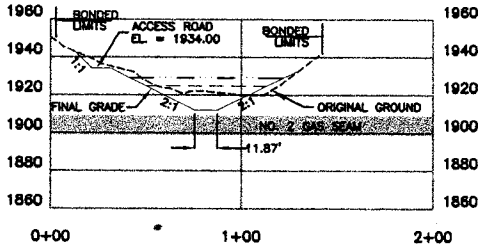
PROFILE A-A'

SCALE: 1" = 100' (H&V)



SECTION E-E'

SCALE: 1" = 100' (H&V)



SECTION G-G'

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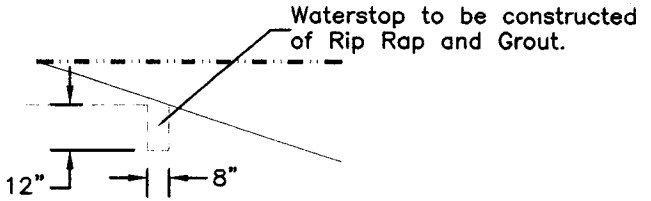
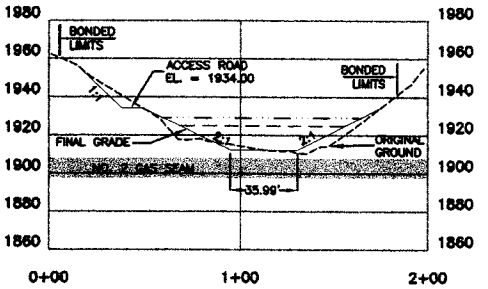


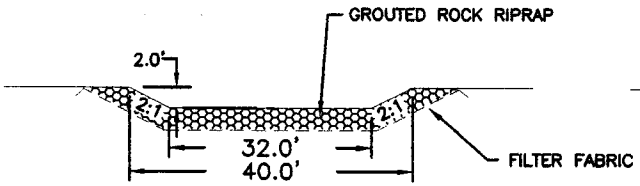
WATERSTOP - DETAIL

Not to Scale



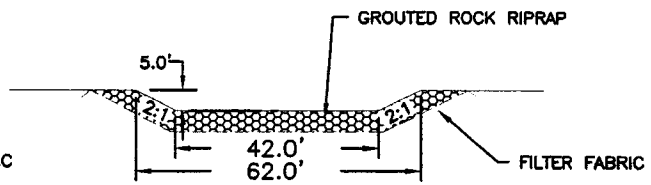
SECTION F-F'

SCALE: 1" = 100' (H&V)



TYPICAL SPILLWAY - SLOPE SECTION

Not to Scale



TYPICAL SPILLWAY - CONTROL SECTION

Not to Scale

NORMAL POOL EL. = 1929.00
CLEANOUT EL. = 1924.69
BOT. EL. = 1912.00

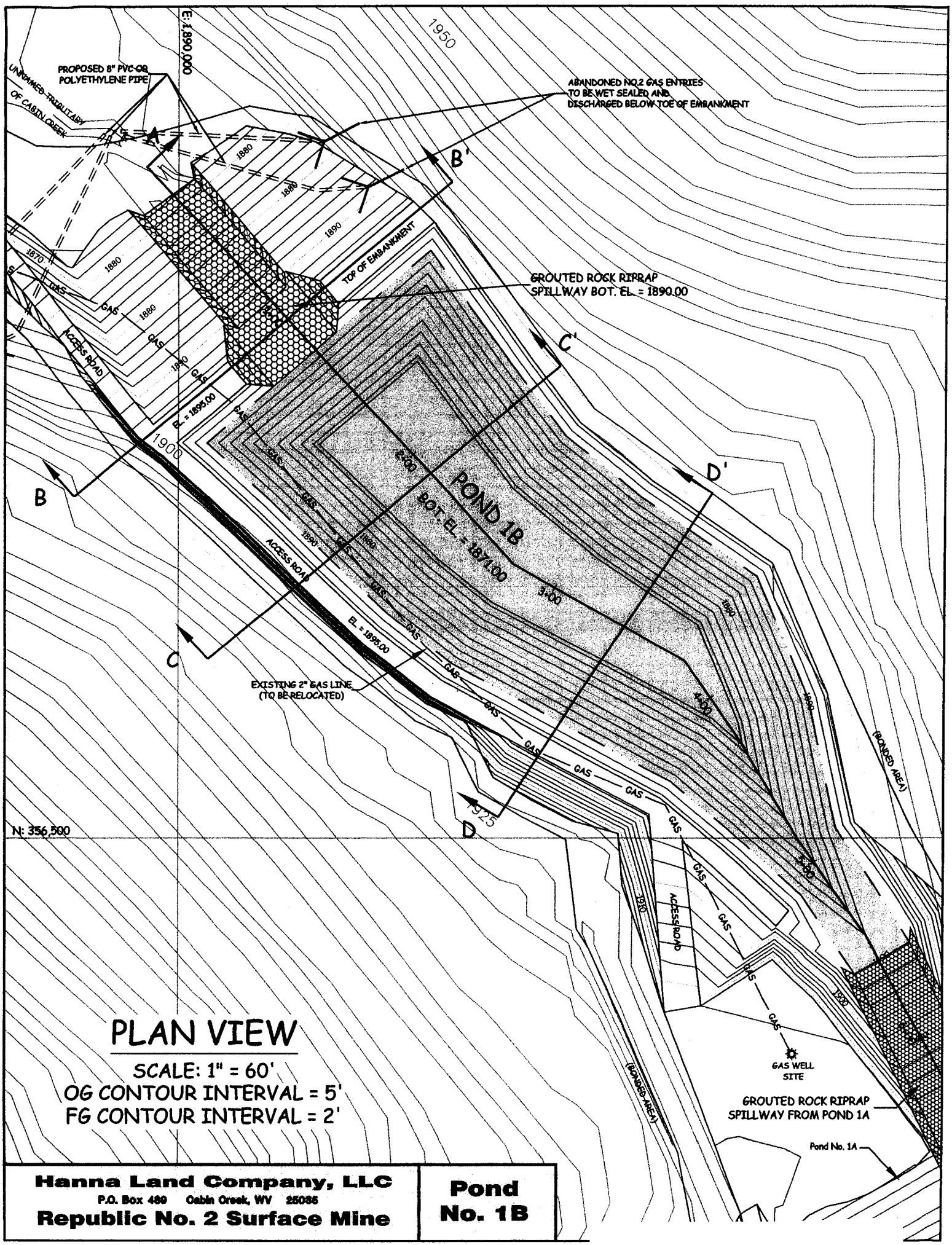
PROFILE & SECTIONS

SCALE: 1" = 100'

FIGURE 9A

Hanna Land Company, LLC
P.O. Box 486 Cabin Creek, WV 25035
Republic No. 2 Surface Mine

Pond No. 1A



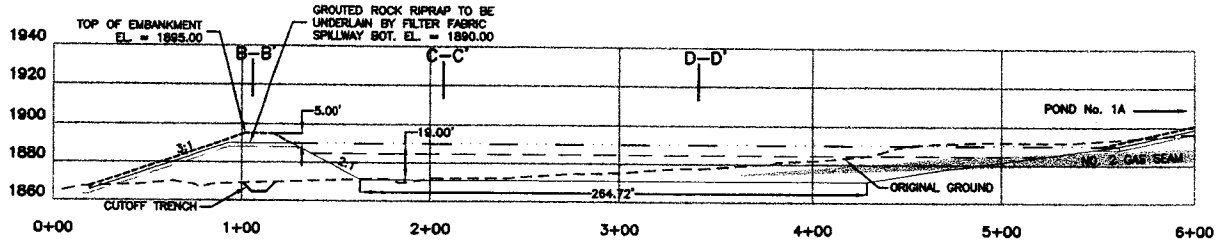
PLAN VIEW

SCALE: 1" = 60'
OG CONTOUR INTERVAL = 5'
FG CONTOUR INTERVAL = 2'

Hanna Land Company, LLC
P.O. Box 469 Cabin Creek, WV 25035
Republic No. 2 Surface Mine

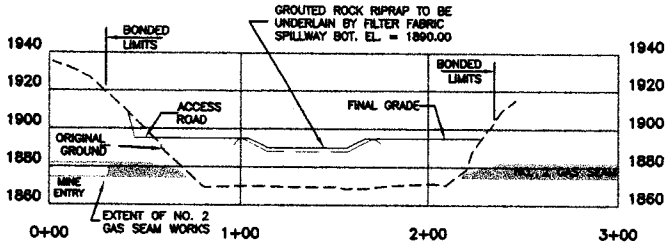
Pond No. 1B

FIGURE 10



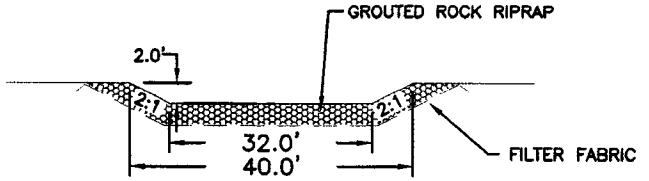
PROFILE A–A'

SCALE: 1" = 100' (H&V)



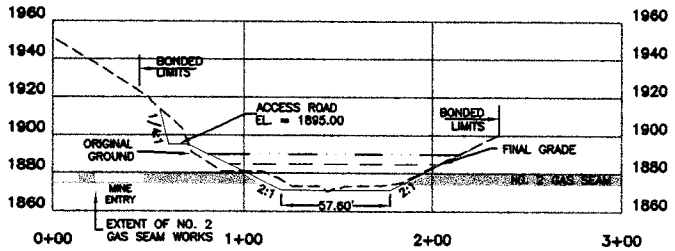
SECTION B–B'

SCALE: 1" = 100' (H&V)



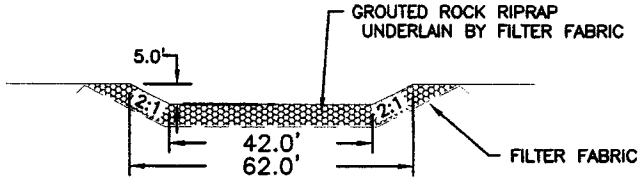
TYPICAL SPILLWAY – SLOPE SECTION

Not to Scale



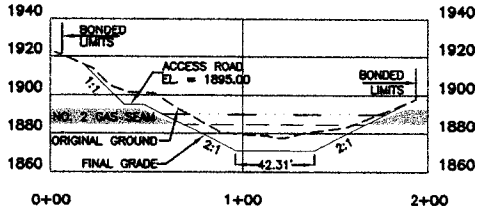
SECTION C–C'

SCALE: 1" = 100' (H&V)



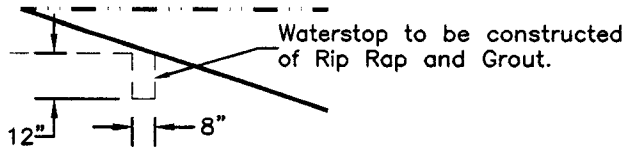
TYPICAL SPILLWAY – CONTROL SECTION

Not to Scale



SECTION D–D'

SCALE: 1" = 100' (H&V)



WATERSTOP – DETAIL

Not to Scale

NORMAL POOL EL. = 1890.00
CLEANOUT EL. = 1884.75
BOTTOM EL. = 1871.00

PROFILE & SECTIONS

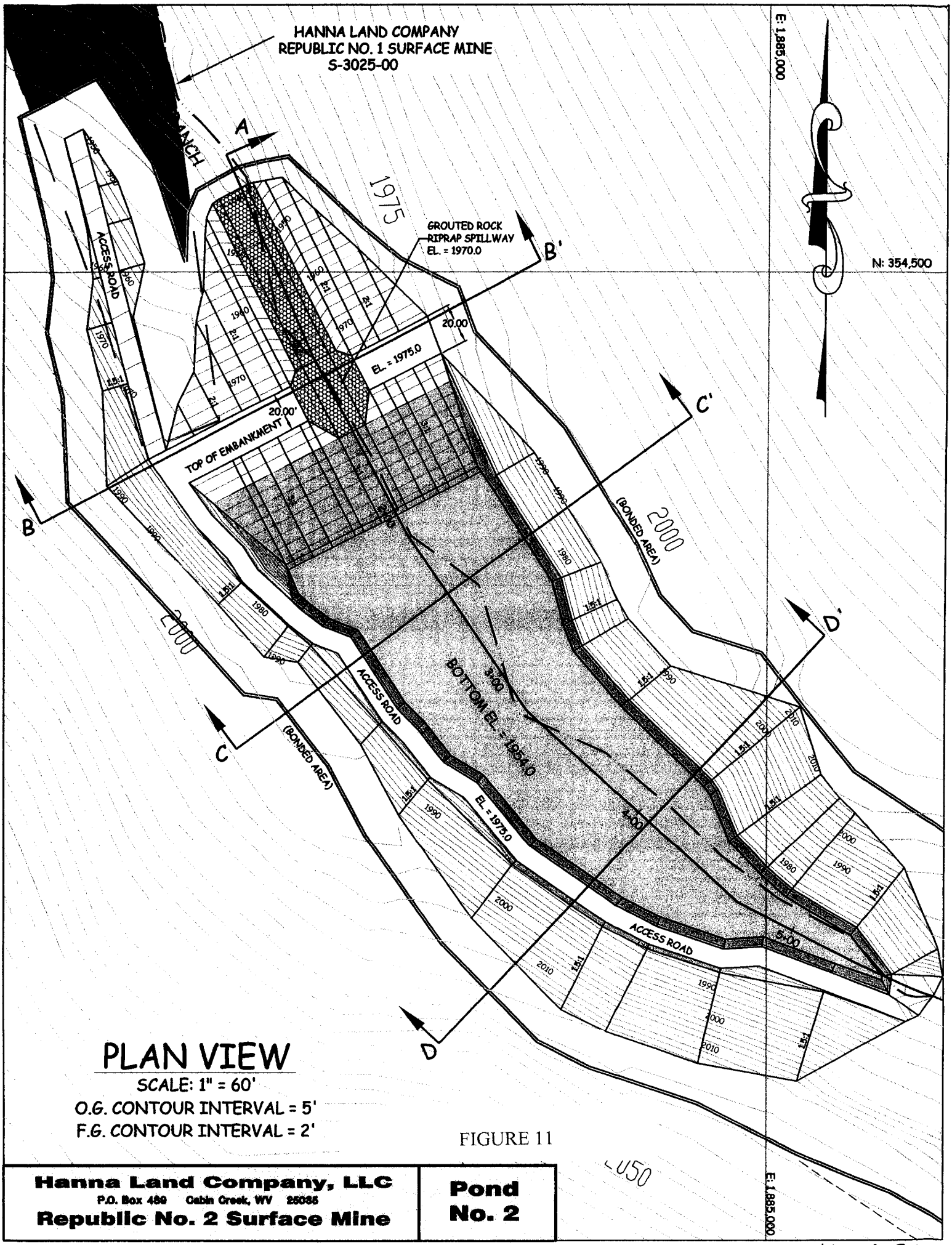
SCALE: 1" = 100'

FIGURE 10A

Hanna Land Company, LLC
P.O. Box 400 Cabin Creek, WV 25035
Republic No. 2 Surface Mine

Pond No. 1B

15 of 30



PLAN VIEW

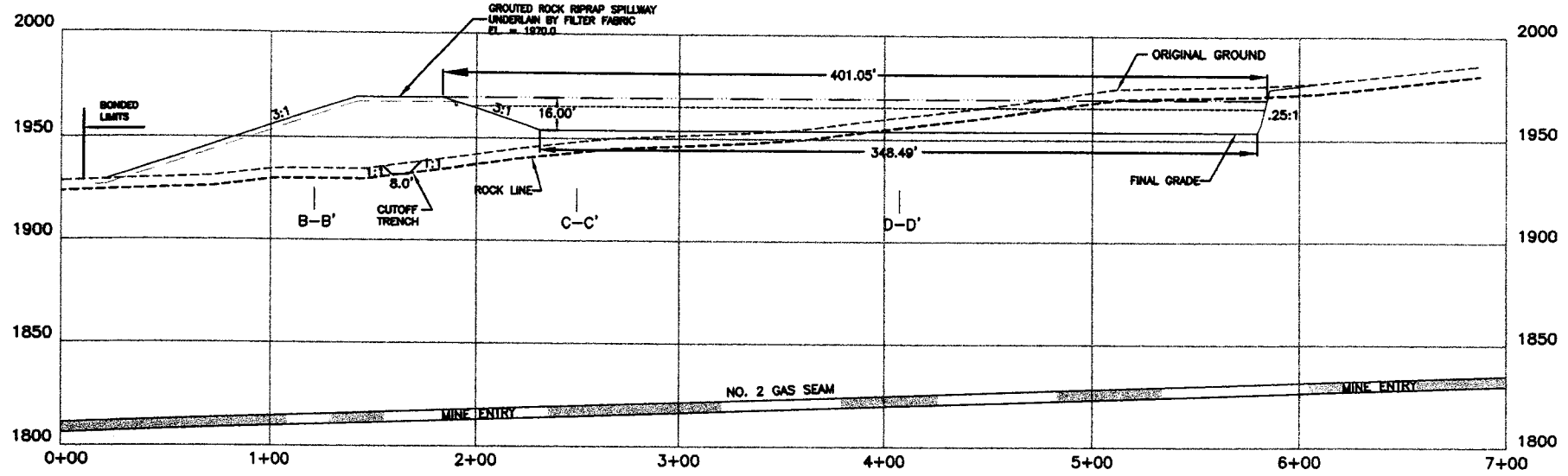
SCALE: 1" = 60'

O.G. CONTOUR INTERVAL = 5'

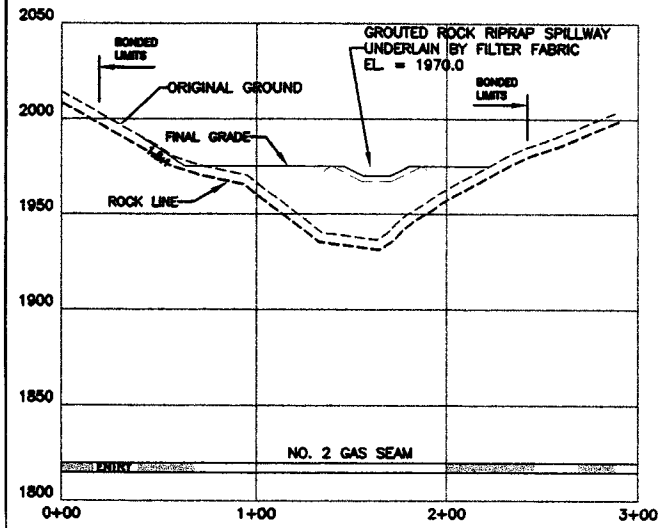
F.G. CONTOUR INTERVAL = 2'

FIGURE 11

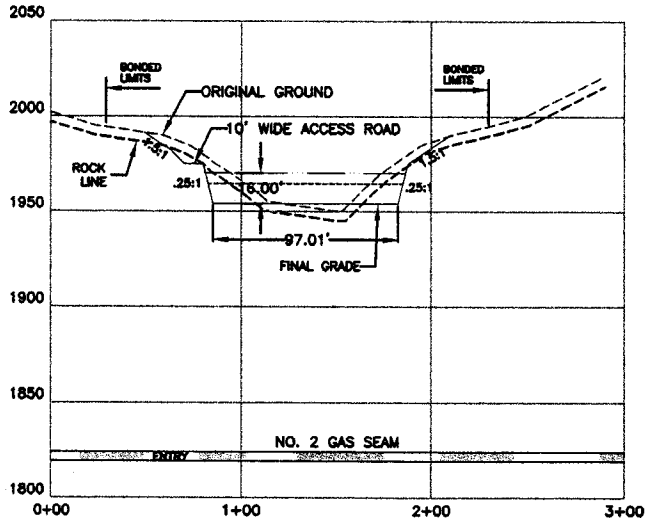
Hanna Land Company, LLC P.O. Box 489 Cabin Creek, WV 25035 **Republic No. 2 Surface Mine**	**Pond No. 2**



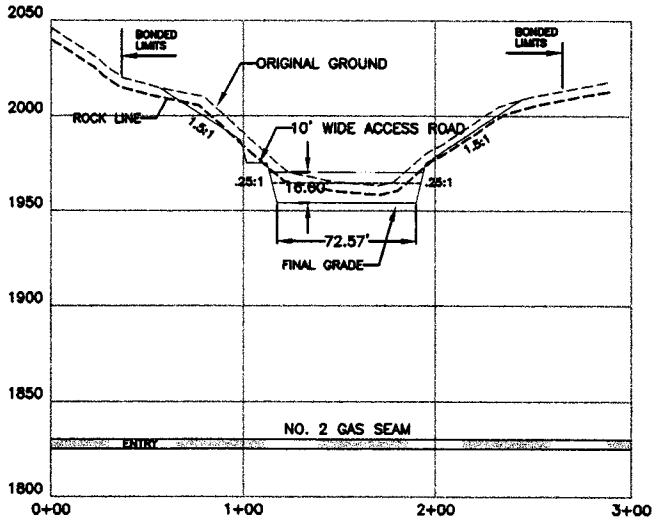
PROFILE A–A'
SCALE: 1" = 100'



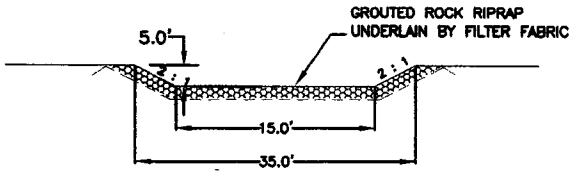
PROFILE B–B'
SCALE: 1" = 100'



PROFILE C–C'
SCALE: 1" = 100'



PROFILE D–D'
SCALE: 1" = 100'



TYPICAL SPILLWAY – CONTROL SEC
Not to Scale

NORMAL POOL EL. = 1970.0
CLEANOUT EL. = 1964.20
BOTTOM EL. = 1954.0

PROFILE & SECTIONS

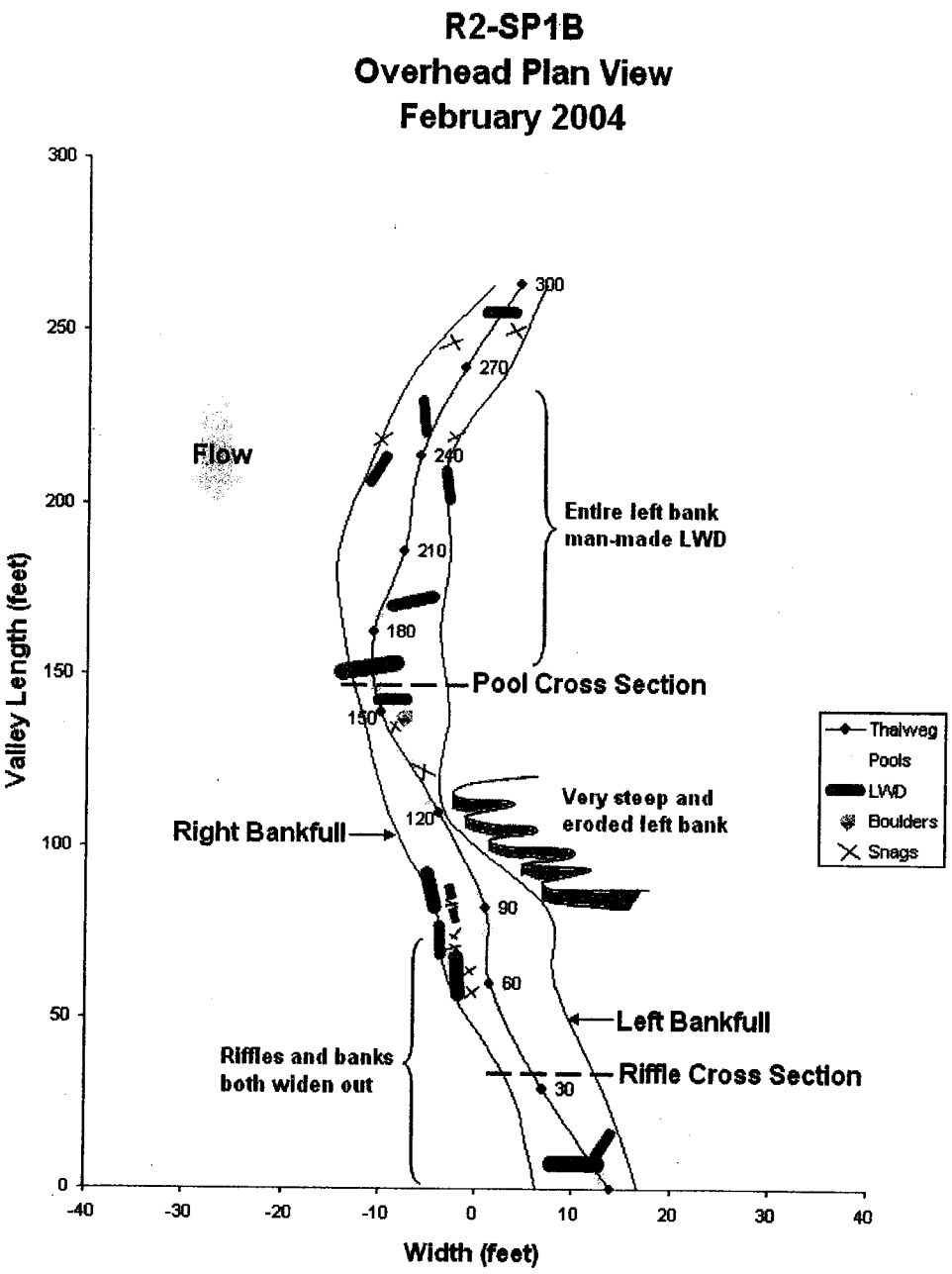
SCALE: 1" = 100'

FIGURE 11A

Hanna Land Company, LLC
P.O. Box 489 Cabin Creek, WV 25035
Republic No. 2 Surface Mine

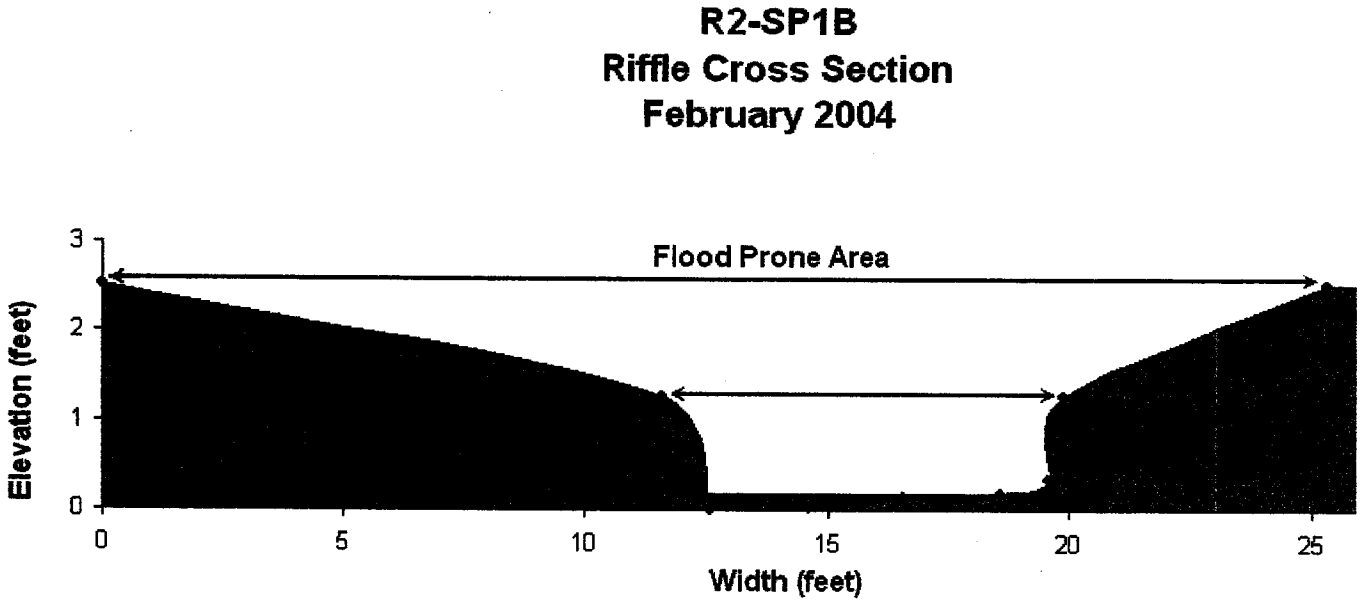
Pond No. 2

17 of 30



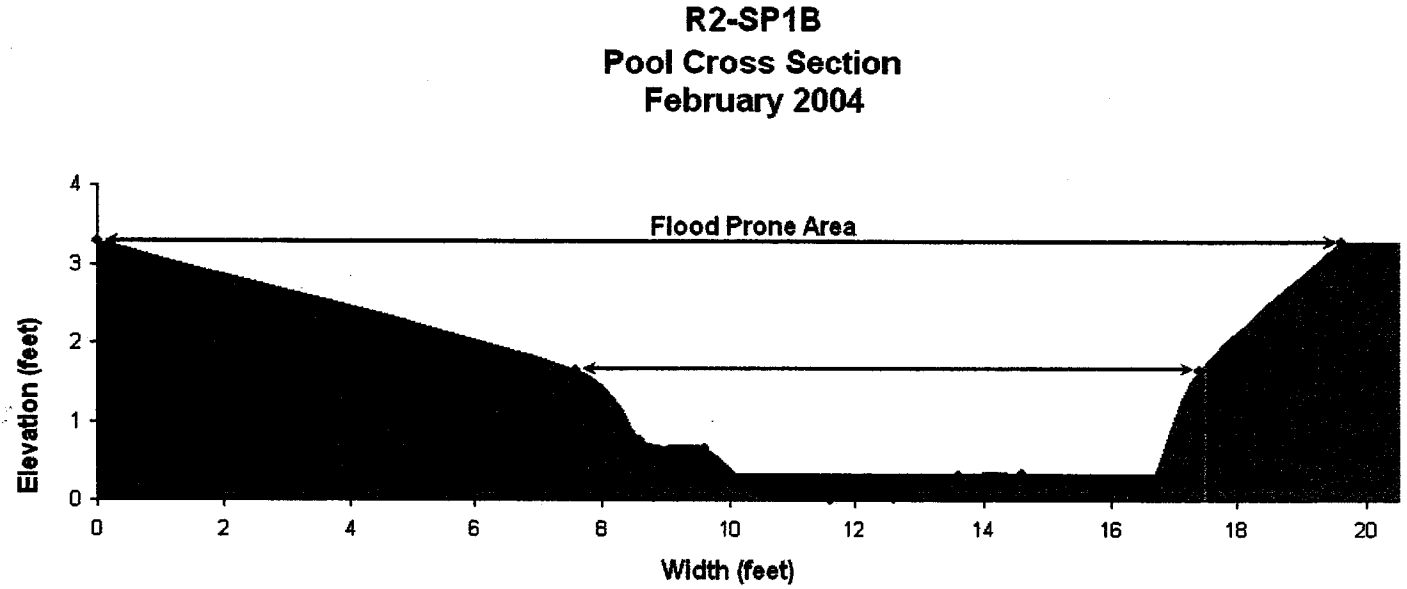
Overhead plan view of the Republic No. 2 - Sediment Pond 1B stream reach. Alex Energy, Inc., March 2004.

FIGURE 12
ON-SITE MITIGATION FOR
TEMPORARY IMPACTS



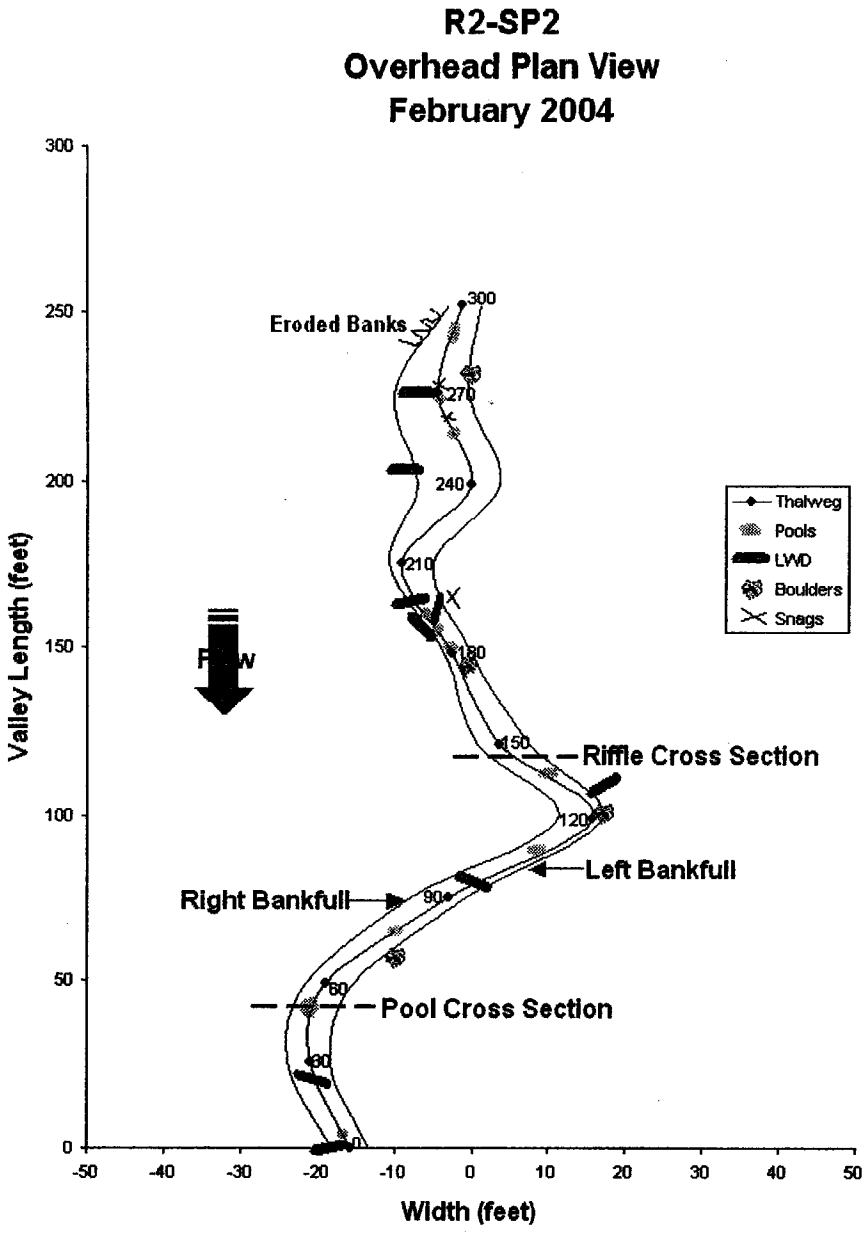
Republic No. 2 - Sediment Pond 1B cross-sectional view of a riffle section. Alex Energy, Inc., March 2004.

FIGURE 12a



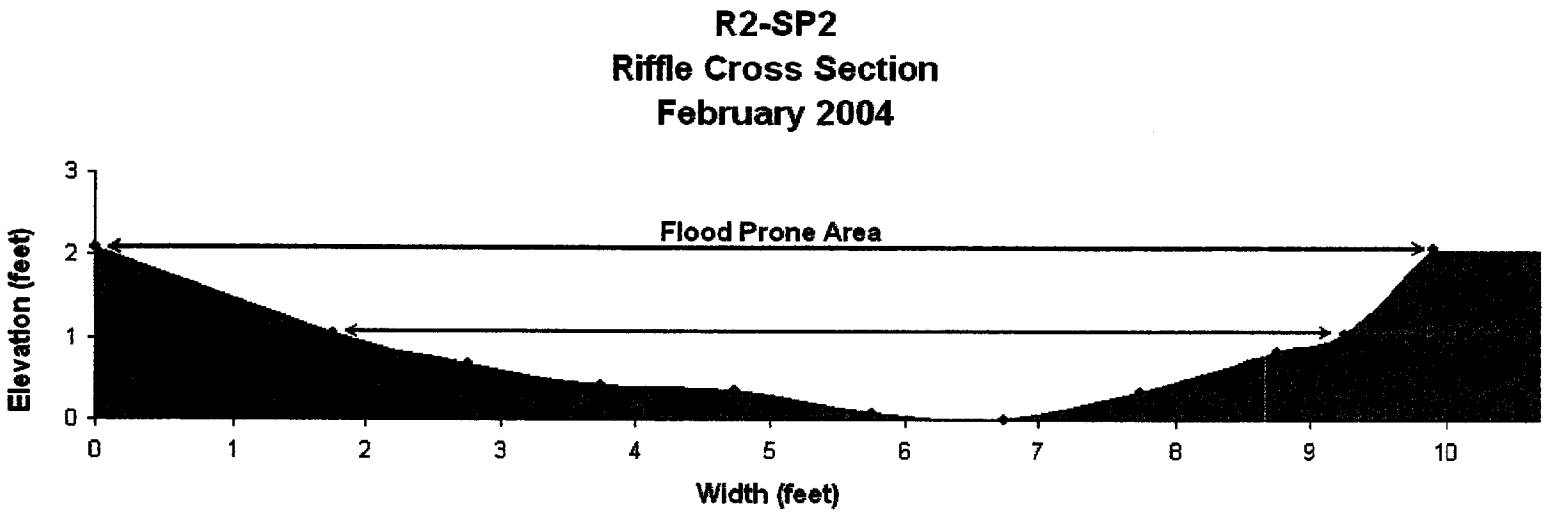
Republic No. 2 - Sediment Pond 1B cross-sectional view of a pool section. Alex Energy, Inc., March 2004.

FIGURE 12b



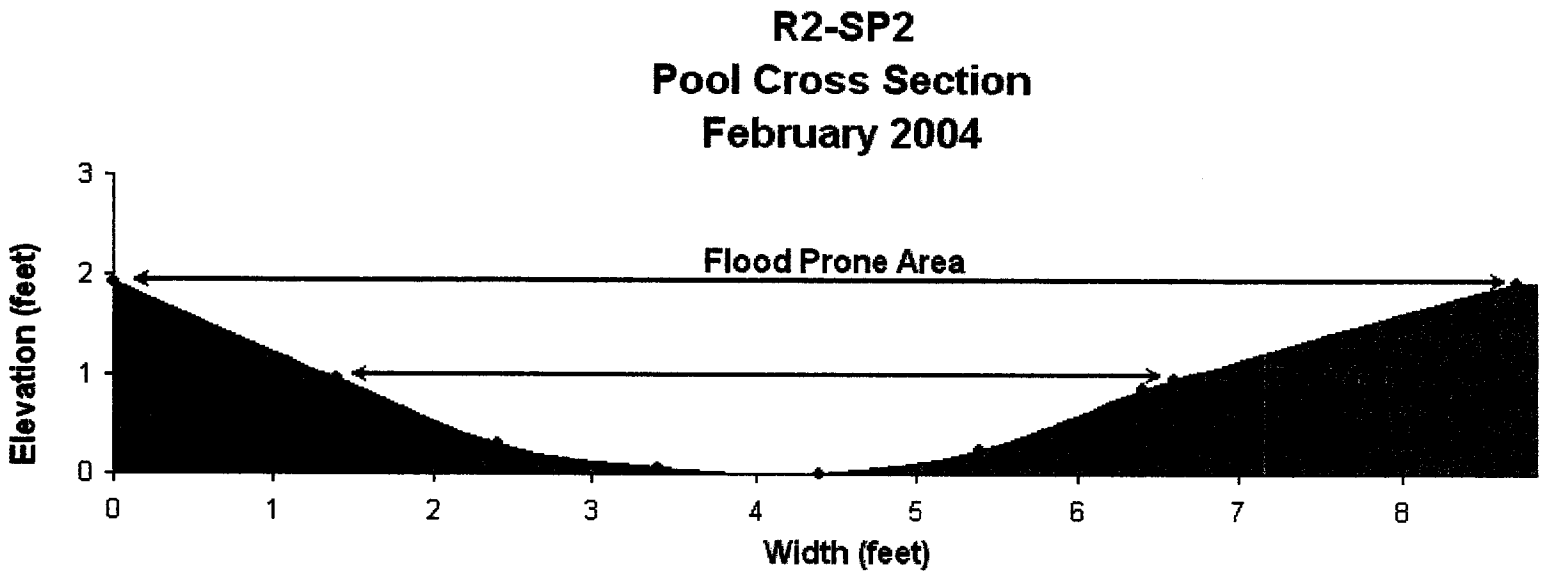
Overhead plan view of the Republic No. 2 - Sediment Pond 2 stream reach. Alex Energy, Inc., March 2004.

FIGURE 12c



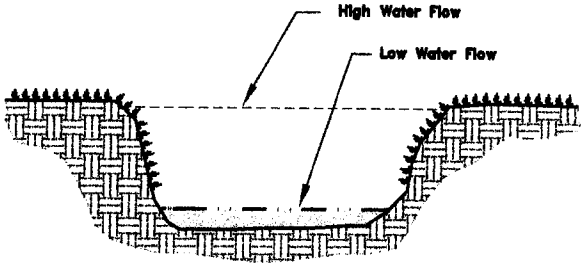
. Republic No. 2 - Sediment Pond 2 cross-sectional view of a riffle section. Alex Energy, Inc., March 2004.

FIGURE 12d

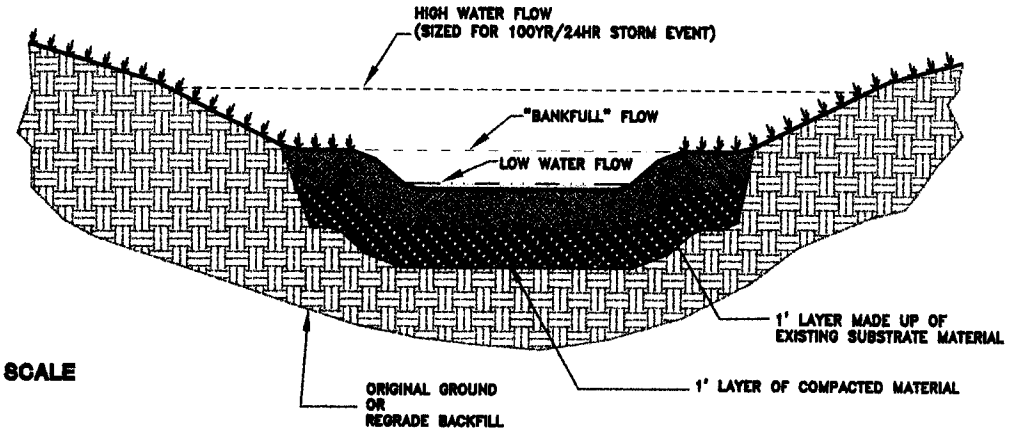


Republic No. 2 - Sediment Pond 2 cross-sectional view of a pool section. Alex Energy, Inc., March 2004.

FIGURE 12e



EXISTING STREAM CHANNEL



NOT TO SCALE

PERMANENT RELOCATED STREAM CHANNEL
'CHANNEL WITHIN A CHANNEL' DESIGN

CONSTRUCTION SPECIFICATIONS FOR STREAM CHANNEL ALTERATION

Site Preparation:
The existing stream channel will be surveyed with regard to dimension, pattern and profile and the records of this survey will be maintained for use as reference in the relocation and restoration process. Prior to the construction of the relocated channel, obstructions, such as trees, shrubs and boulders, shall be removed, as necessary, to establish suitable line and grade for the relocated stream. In addition to the proposed, during mining, sediment control structures (ponds), temporary drainage control devices will be installed as needed during construction. These temporary devices may consist of any one, or a combination of, the following; silt fencing, straw bales, rock checks, level spreaders and/or sumps.

Excavating and Shaping:
Construction of the relocated channel will begin at the farthest downstream end and progress upstream. Areas of stream channel relocation that extend into the proposed mineral removal area will be compacted and/or lined, to lessen infiltration into the backstack, prior to the shaping of the actual channel. Areas which receive small drainage flow or are located near the base of existing valley fills will be compacted by mechanical means using the equipment on site. Areas receiving larger drainage flows, such as 4th Right Fork of Ballard Fork, Spring Branch and 1st Right Fork of Spring Branch will be lined with a one foot thick compacted layer of clay soil beneath the reconstructed channel (see attached section drawing). Abundant clay soil material is present in the overburden located above the coal seam. This material will be separated and stored on site for use during stream channel reconstruction.

The last step of the construction will be to divert the existing flow into the reconstructed channel.The completed channel shall conform to the line, grade, and cross section of the existing streambed as determined from the pre-construction survey. By using the dimensional data of the existing stream as a model for the relocated stream, the relocated stream will essentially retain its original shape and profile and merely be 'shifted' laterally on the valley floor.
The reconstructed channel profile shall be generally free draining, with low spots kept to a minimum. All portions of the completed construction area are to be finished and smoothed as needed for the establishment of vegetative cover. See the attached cross sections and profiles of the existing and proposed channels for additional details.

Protection Against Erosion:
The completed relocated channel shall be seeded and mulched immediately after construction, as described in the following stream stabilization plan. During construction of the relocated channel (or in areas where the existing streambed is being mined through), normal stream flow will be diverted though a 24" corrugated plastic pipe. The bypass pipe will be extended downstream, around the construction/mining area. The proposed temporary stream bypass pipe will be anchored on the upstream end with a check dam constructed of sand bags and sheet plastic (see 'Stream Relocation Construction Sequence' drawing). The check dam will insure that all stream flow is directed to the temporary culvert bypass. Should any leakage occur around the check dam, it is anticipated that this leakage will be minimal and a pump will be maintained on site to divert such leakage away from the construction area and into the temporary culvert bypass. If during construction additional temporary drainage control structures are needed they may consist of any one or combination of the following; silt fencing, straw bales, rock checks, level spreaders and/or sumps.

STREAM ENHANCEMENT

As stated previously, stream channel relocation will be permanent and will take place before mining activities are conducted in those particular areas. It is preferable to relocate the existing channel away from the proposed mining activities and away from any possible future operations. The relocated stream channel will be 'enhanced' in section to a "channel within a channel" type or flow design. After the existing stream channel has been relocated laterally along the valley floor, the area above the 'bankfull' elevation will be raised using excess material from the contour excavation. This "channel within a channel" design will allow for the more frequent storm events (1.1 to 1.8 year return period) to have the ability to maintain the balance between natural channel scour and sediment deposition processes, thereby resulting in a stable, self-cleaning channel. Additional hydraulic capacity required to handle the more severe storm events is provided outside (above) the "bankfull" channel. The existing stream channel will be surveyed with regard to dimension, pattern and profile and the records of this survey will be maintained for use as reference in the relocation and restoration process.

Composition of the relocated stream sections will be based on the average existing substrate listed in the Benthic Survey in this application. This composition consists of 0% bedrock,
10% boulders, 42% cobble, 33% gravel and 5% Sand, 5% Silt and 5% Clay. All of these materials will be abundant and readily available on site as reclamation progresses.

Streambeds along trapezoidal sections that are not in bedrock will be modified and will not be installed so they are level from bank to bank. Instead, the streambed will be sloped toward the outside bank in curves and toward either the right bank or left bank along straight sections as dictated by conditions in the field. During periods of low flow, the modified streambed will prevent stream flow from being evenly and shallowly distributed along the bottom of the stream. Instead, stream flow will be concentrated in the depression created by the modified streambed.

Benthic organism recovery will be monitored for a period of two (2) years beyond the final
reclamation of the operation.

The monitoring program shall adhere to the following minimum requirements:
At lease one (1) benthic collection per year to be collected and analyzed by a certified laboratory.
Benthic will be collected during the spring collection season.
Benthic will be collected at Benthic stations 45, 48, 49, 50 and 54.
Additional monitoring sites or collection periods may be added as necessary.

FIGURE 12f

Prepared by: PA ENGINEERS & CONSULTANTS

Drawing Date:	Drawn By:
02/25/04	G. Grubbs
Computer No.:	Topo Contour Interval:
Stream	N/A
Scale:	
No Scale	

Massey Energy

Hanna Land Company, LLC
P.O. Box 2814 Charleston, WV 25330

Republic No. 2 Surface Mine
Permit No. S-3001-01
NPDES No. WV1018422

Stream Enhancement Construction Details

The Cross-Vane, W-Weir and J-Hook Vane are structures that can be implemented to maintain or enhance river stability and function to facilitate multiple objectives.

Descriptions, design specifications, placement locations, spacing and various applications of Cross-Vane, W-Weir and J-Hook Vane structures are shown here. These structures were developed and should be subsequently applied to: 1) establish grade control, 2) reduce streambank erosion, 3) facilitate sediment transport, 4) provide for irrigation diversion structures, 5) enhance fish habitat, 6) maintain width/depth ratio, 7) improve recreational qualities, 8) maintain river stability, 9) dissipate excess energy, 10) withstand large floods, 11) maintain channel capacity, 12) be compatible with natural channel design, and 13) be visually acceptable to the public.

DESIGN SPECIFICATIONS

Cross-Vanes, W-Weirs and J-Hook Vanes

Vane Angle
The vane arm portion of all three structures is generally 20-30 degrees measured upstream from the tangent line where the vane intercepts the bank. The 20-30 degree angle provides the longest vane length and protects the greatest length of streambank. The vane portion of the structure should occupy ⅓ of the bankfull width of the channel, while the "hook" should occupy the center ⅓. Maximum velocity, shear stress, stream power and velocity gradients are decreased in the near-bank region and increased in the center of the channel. Sediment transport competence and capacity can be maintained as a result of the increased shear stress and stream power in the center ⅓ of the channel. Backwater is created only in the near-bank region, and the small departure angle gently redirects the velocity vectors from the near-bank region, reducing active bank erosion. The scour pool in the center ⅓ of the channel provides energy dissipation and holding cover for fish. The "hook" portion of the vane produces a longer, wider and deeper pool than that created by vane-only structures. The downstream pool dissipates energy and provides fish habitat. The ¼ - ½ rock diameter gaps between the rocks associated with the hook creates a vortex or cortisarew flow that diversions. The flatter and smaller vane angle arm will extend farther upstream to intercept proportionately more water and increase the length of bank protected.

Vane Slope
The slope of the vane extending from the bankfull stage bank should vary between 2-7percent. Vane slope is defined by the ratio of bank height/vane length. For installation in meander bends, ratios of J-Hook Vane length/bankfull width is calculated as a function of the ratio of radius of curvature/bankfull width and departure angle (Table 1). Equations for predicting ratios of J-Hook Vane spacing/bankfull width on meander bends based on ratio of radius of curvature/bankfull width and departure angle is shown in Table 2. Vane length is the distance measured from the bankfull bank to the intercept with the invert elevation of the streambed at ⅓ of the bankfull channel width for either Cross-Vanes or J-Hook Vanes.

Table 1. Equations for predicting ratio of vane length/bankfull width (VL) as a function of ratio of radius of curvature/width and departure angle, where W = bankfull width. (SI units)

Rc/W	Departure Angle (degrees)	Equation
3	20	VL = 0.0057 W + 0.9462
3	30	VL = 0.0089 W + 0.5833
6	20	VL = 0.0057 W + 1.0462
6	30	VL = 0.0057 W + 0.8462

Table 2. Equations for predicting ratio of vane spacing/width (Vs) as a function of ratio of radius of curvature/width and departure angle, where W = bankfull width (SI units)

Rc/W	Departure angle (degrees)	Equation
3	20	Vs = - 0.006 W + 2.4781
3	30	Vs = - 0.0114 W + 1.9077
6	20	Vs = - 0.0057 W + 2.5538
6	30	Vs = - 0.0089 W + 2.2067

The spacing of J-Hook Vanes can be increased by 0.40W if there exists a low bank erosion hazard rating (BEHI) of less than 30.

Bank Height
The structure should only extend to the bankfull stage elevation. If the bank is higher, a bankfull bench is constructed adjacent to the higher bank and the structure is integrated into the bench.

Footers
The minimum footer depth at the invert for cobble and gravel bed streams should be a ratio of three times the protrusion height of the invert rock. This measurement is used for all three structures. For sand bed streams, the minimum depth is doubled due to the deeper scour depths that occur. All rocks for all three structures require footers. If spaces are left between the invert rocks for Cross-Vane and W Weirs, then the top of the footer rocks becomes the invert elevation for grade control. If no gaps are left, then the top of the surface rock becomes the base level of the stream.

Materials
The Cross-Vane can be constructed with boulders, logs and a combination of both. A geotextile fabric is required to prevent scour under the structure when logs are used or when rocks are used in sand or silt/clay bed channels.

APPLICATIONS

Irrigation Diversions
Cross-Vanes and W-Weirs have both been used successfully for irrigation structures. Both the Cross-Vane and W-Weir create a differential head in the near-bank region due to the flat slope of the vane leading to the bank. This condition provides the head to deliver water to the head gate at very low flows so that it is not necessary to construct sacrificial dams at low flows. When the head gate is closed during high flows, fine sediments often accumulate. To prevent the sediment deposition at the head gate and in the irrigation canal, a sediment sluice gate is installed so that the sediment is delivered back to the channel during normal high flows.

Grade Control
The Cross-Vane is used to maintain base level in both riffle/pool channels, rapids-dominated stream types and in step-pool channels. The Cross-Vane, as used for grade control, maintains the new width/depth ratio, entrenchment ratio, reduces bank erosion, dissipates energy and improves fish habitat. Spacing of the structures is based on a negative power function relationship of the ratio of pool spacing / bankfull width as a function of slope.

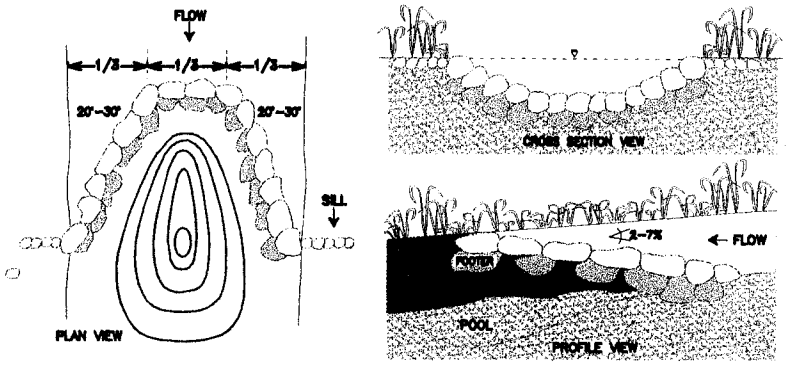
$$Ps = 8.2513\ S^{-0.8788}$$

Where Ps = the ratio of pool to pool spacing/bankfull width
S = channel slope in percent

Bridge Protection
Bridges constructed on a skew to the channel and/or placed on an outside bend often experience abutment scour and embankment erosion. This problem can be reduced by the placement of an offset Cross-Vane in the upstream reach. The vane on the outer bank in the bend has a flatter slope and smaller angle (20°), while the vane arm on the inside bank has a steeper slope and a larger angle (30°). W-Weirs are particularly useful for reducing center pier scour. Both the Cross-Vane and W-Weir can provide grade control, prevent lateral migration of channels, eliminate fish migration barriers, increase sediment transport capacity and competence and reduce footer scour. J-Hook Vanes can reduce bank erosion on outside banks both for the approach and downstream reaches of the bridge.

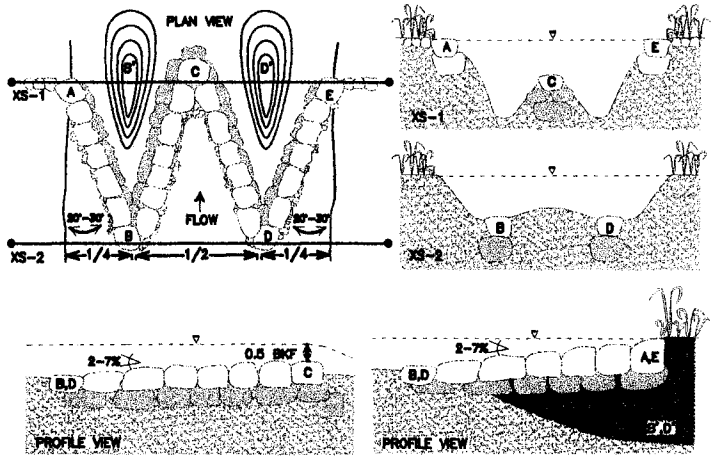
Streambank Stabilization
The J-Hook Vane is designed to reduce accelerated streambank erosion on the outside bend of meanders. As a minimum, the amount of bank protected is two times the vane length, while maximum spacing provides approximately three times the bank protection to vane length. If both banks are eroding due to confinement (lateral containment) and entrenchment (vertical containment), then the Cross-Vane decreases the stream power and shear stress concurrently on both banks. This avoids lining or hardening both banks through a reach to provide protection.

CROSS-VANE ROCK WEIR
Cross-vane Rock Weirs are grade control structures designed to slow the energy of a stream that would otherwise increase stream bank erosion. These devices are appropriate in areas of high gradient (large elevation change in a short distance). The function of the Cross-vane Rock Weir is to concentrate the effects of large elevation change in a stream channel into a more controlled situation while at the same time allowing fish passage and a low-flow stream channel. The stone should be trenched into the stream bank at sharp angles in a general "V" shape pointing upstream. Two lines of rock are utilized to create a stable structure, utilizing the principle that water will flow off of immovable objects at right angles (90° angles). The downstream line of rock should be trenched into the stream bottom so that the tops of the rock are approximately level with the stream bottom. The upstream line of rock should be overlapped onto the downstream line of rock and the device should be elevated appropriately, the center lower than at the stream banks, to concentrate the flow into the center of the stream channel. The Cross-vane Rock Weir will provide mid-channel scour pool that will provide fish habitat as well as the ability for fish to maneuver and migrate past them upstream.



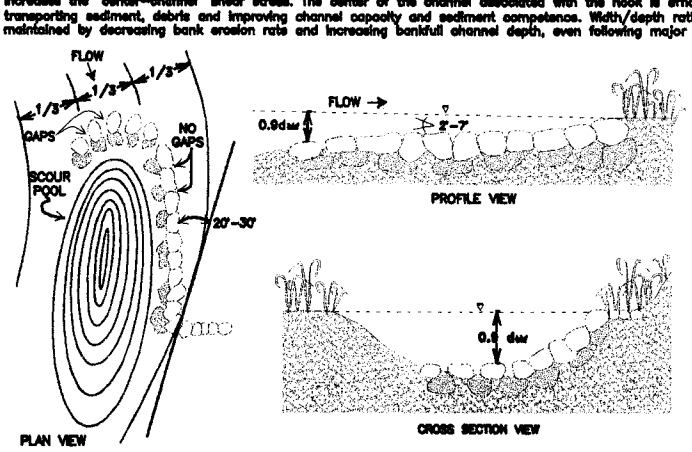
ROSGEN DESIGN - CROSS VANE ROCK WEIR

W-Weir
The design of the W-Weir (W as looking in the downstream direction) was initially developed to resemble bedrock control channels on larger rivers. The W-Weir is similar to a Cross-Vane in that both sides are vanes directed from the bankfull bank upstream toward the bed with similar departure angles. From the bed at ¼ and ¾ channel width, the crest of the weir rises in the downstream direction to the center of the bankfull channel creating two thalwegs. The objectives of the structure are to provide grade control, enhance fish habitat, stabilize stream banks, facilitate irrigation diversions, reduce bridge center pier and foundation scour, and increase sediment transport at bridge locations. Habitat for fish may be enhanced by maximizing usable holding, feeding and spawning areas. Fish hold in the multiple feeding lanes created by the two thalweg locations and pools. Spawning habitat is created in the tail-out of the pools due to upwelling currents and a sorting of gravel bed material sizes.



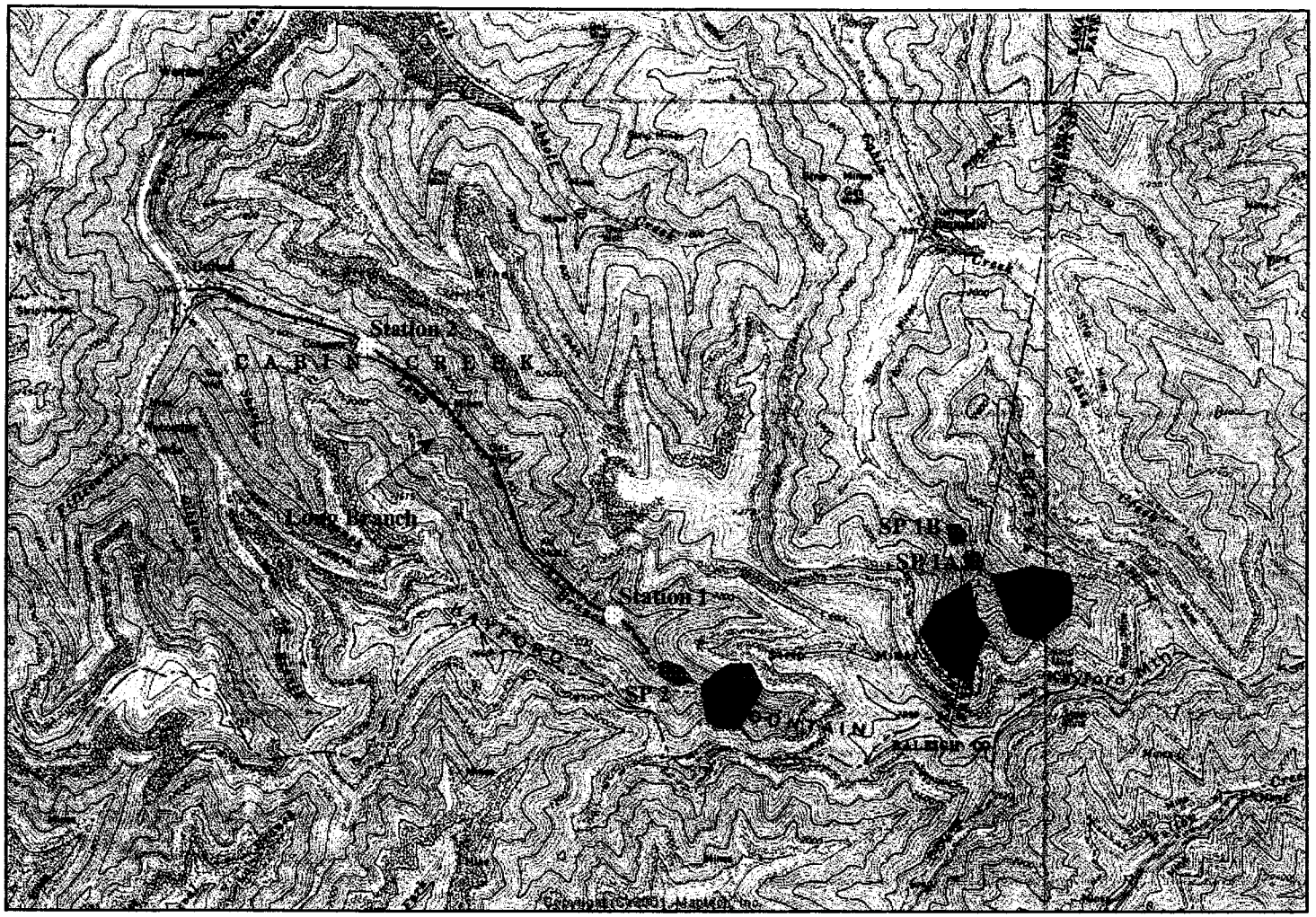
ROSGEN DESIGN - W-WEIR

J-Hook Vane
The J-Hook Vane is an upstream directed, gently sloping structure composed of natural materials. The structure can include a combination of boulders, logs and root wads and should be located on the outside of stream bends where strong downwelling and upwelling currents, high boundary stress, and high velocity gradients generate high stress in the near-bank region. The structure is designed to reduce bank erosion by reducing near-bank slope, velocity, velocity gradient, stream power and shear stress. Redirection of the secondary cells from the near-bank region does not cause erosion due to back-eddy re-circulation. The vane portion of the structure occupies ⅓ of the bankfull width of the channel, while the "hook" occupies the center ⅓. The ¼ -½ rock diameter gaps between the rocks associated with the hook creates a vortex or cortisarew flow that increases the "center-channel" shear stress. The center of the channel associated with the hook is efficient at transporting sediment, debris and improving channel capacity and sediment competence. Width/depth ratios are maintained by decreasing bank erosion rate and increasing bankfull channel depth, even following major floods.



ROSGEN DESIGN - CROSS VANE WEIR

Stream Enhancement Construction Details



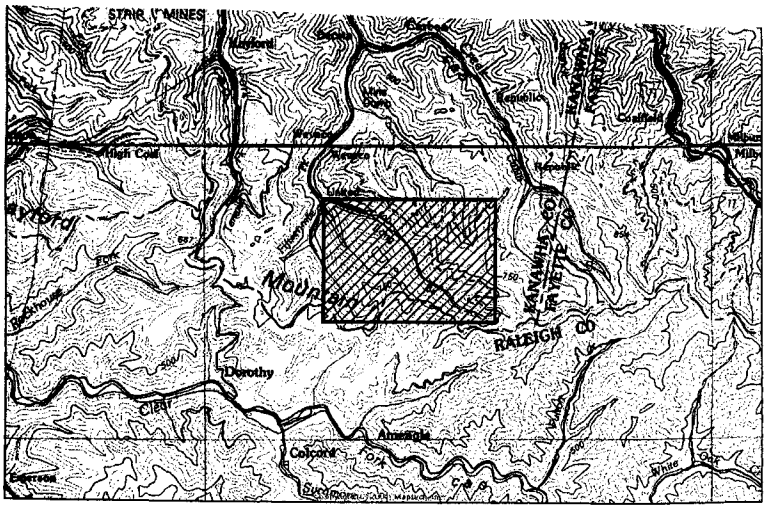
Topographical map showing approximate locations of proposed valley fills (VF, orange), sediment ponds (SP, blue), Long Branch mitigation reach (red) and sampling stations (yellow) located at the Republic 2 Surface Mine. Hanna Land Company, LLC, February 2005.

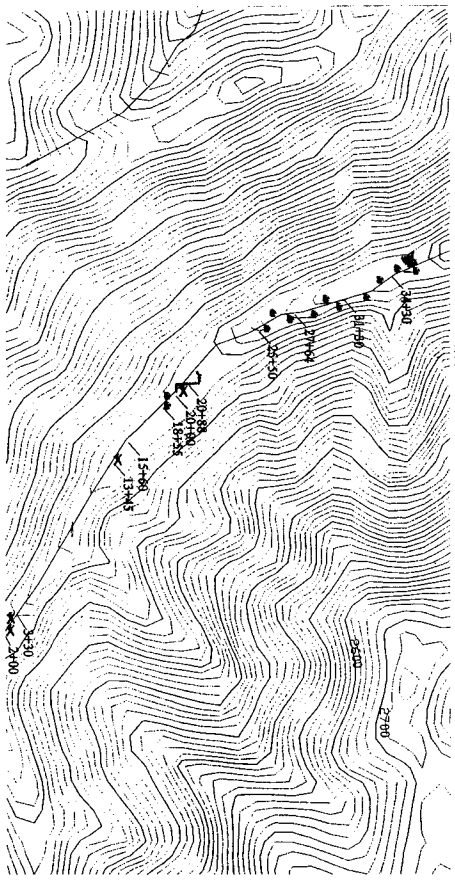
FIGURE 13
OFF-SITE STREAM
MITIGATION MAP

ENHANCEMENT MAP

Quadrangles: Dorothy
County: Raleigh
Latitude: 37° 59' 06.0"
Longitude: 81° 24' 45.0"

General Location: Longbranc
Creek south of Decota, WV





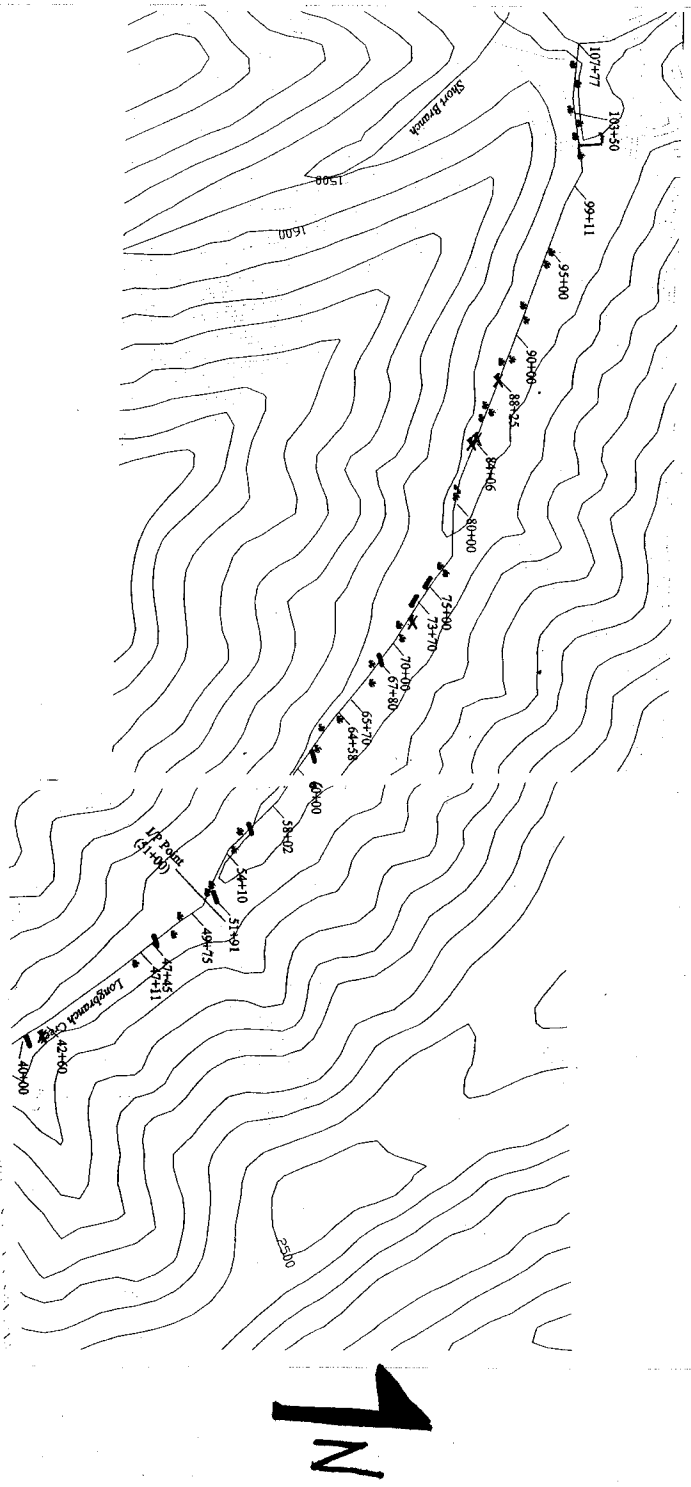
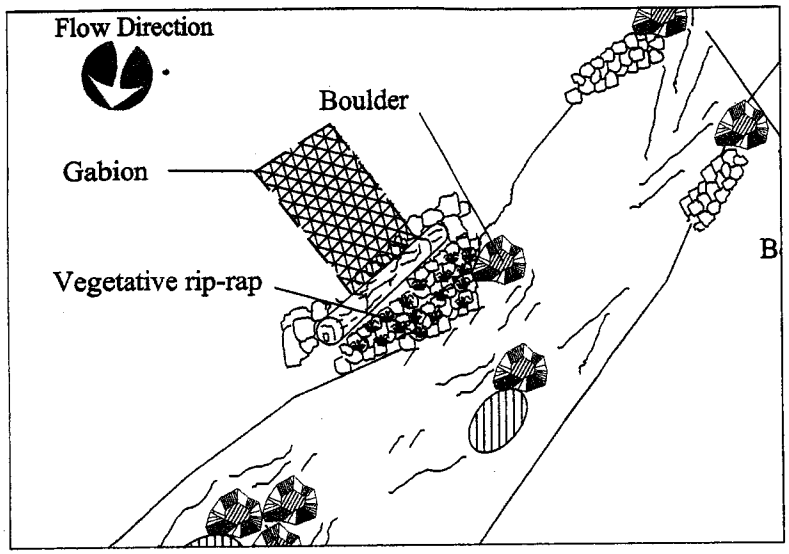
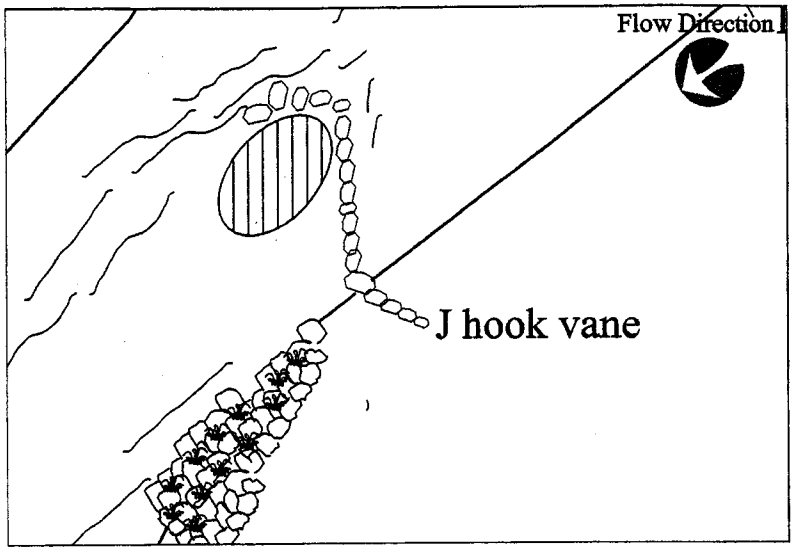


FIGURE 14

Map Legend/Installation Procedures

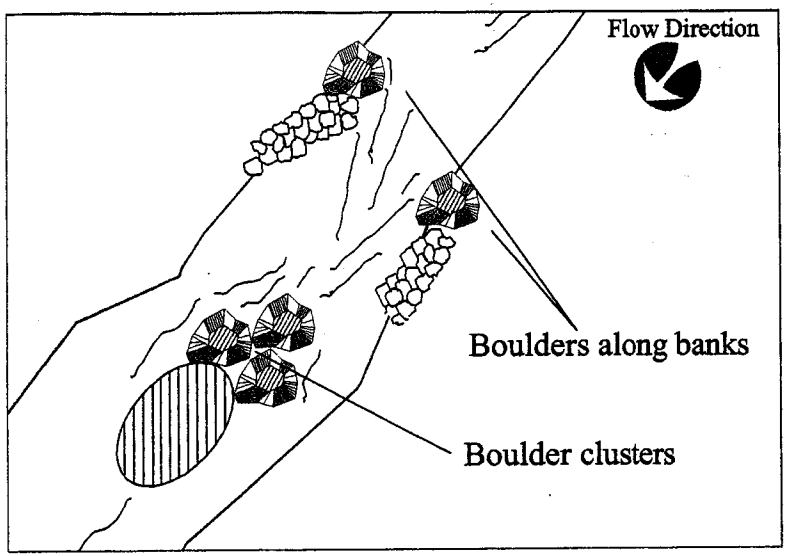


Bank stabilization structures: Gabions and/or vegetative rip-rap. For **gabions**, add live stakes or cuttings within fill material. Install at a depth which is unlikely to be undercut (2 ft) below the channel bottom. Stack in a step-like pattern to provide a more gentle slope along the stream. Place medium to large sized boulders along the bottom of the gabions to aid in future erosion. For **vegetated rip-rap**, clear the area of debris, excavate below the anticipated scour line and regrade the area to 1.5/1 or flatter. Tree planting and layering should be installed into the soil moisture zone during the bank grading and rip-rap placement. Filter fabric should be placed on the graded banks and small holes or slits should be cut for plantings. Place cobble/gravel soil fill around the plantings and rip-rap.



J hook vanes: The structures should be constructed out of large, round-shaped boulders ranging from 3-4 ft diameter with a minimum weight of 200 lbs which are directed upstream lying against the stream flow and tapering down to a 2-7 percent slope. The boulder structures should only extend to the bankfull stage elevation. The top row of rocks will rest on top of a line of long and flat footer rocks so that each vane rock rests upon two halves of each footer rock below and sits offset in the upstream direction. The footer will need to be installed first, which is normally 3 times the protrusion height of the installed boulders. The 'vane' portion of the structure should occupy 1/3 of the bankfull width and the 'hook' should occupy the center 1/3 of the stream channel. The vane should be angled 20-30° upstream. J hooks should be placed 45-50 ft apart to create proper habitats.

FIGURE 14A



Boulder placement: Boulders should range in size from 2-3 ft in diameter, can be any shape (normally blocky and angular rather than round), and can be placed in groups or individually in a random manner. When placed in groups or clusters, th should consist of 3-5 boulders and placed in a triangular manner. The boulder clusters should be spaced a minimum of 15 feet apart. The boulders will rest on t of footer rocks. However, the boulders should not be more than 25-30 % of the bankfull depth after partial embankment.

Step pool installations: Designed out of large grouped boulders. Boulders should be placed on footer rocks that extend below the scouring elevation.One boulder should rest on two halves of footer rocks. Typical pool spacing is between 1 and 4 channel widths. Approximate slope is normally between 0.030 and 0.065°. Average step height is determined by dividing the height by the length divided by the slope.

Culvert installation: A temporary diversion channel, constructed out of sandbags or stones, should be installed. Culvert slope should match the streambed slope. Culverts should span the active channel width and be at or below stream bottom. If the culvert can not be depressed to reach the stream bottom, boulders should be placed around the structure to allow for proper fish passage. If necessary, bank stabilization structures should be installed around the structure and riparian vegetation should be re-established.

Invasive plant species extraction: Non-native vegetation should be mechanically mowed or physically cut, removing the above ground plant along with the root crown and rhizomes (normally in late spring or summer). The cuttings should then be transported to a landfill. If the root crown can not be removed, it may be necessary to use chemical treatment. Glyphosphate herbicide applied as a foliar spray of 2-4% solution (also known as Rodeo or Accord) will then be necessary to control the plant. The populations should be treated in the fall, and repeat cuttings and treatment may be necessary to eradicate the plant. After excavation and chemical treatment, the stream banks should be reconstructed and replanted with vegetation if they were disturbed during excavation.

Native plantings: *Bare rooted trees* should be planted with a tree spade. Depending on the diameter of the tree, they are normally placed in a 2 to 4 foot diameter hole with approximately one-third of the root ball above ground. The tree or sapling should be placed straight up, covered with surrounding soil, packed firmly, and watered. A mulch mixture should then be spread in a three to four inch diameter around the tree trunk. *Container wrapped trees* should be planted in a hole that has a diameter of 12 inches for each inch of tree diameter. The container and surrounding soil mixture should be removed to expose the root system. Additional top soil or peat moss should be added to the hole before backfilling. The surrounding area should be watered and mulched. *Transplanted trees* may need vertical stakes or wires for additional support. Wires should be attached directly above the first branch of the tree, with a rubber hose in between the wire and the tree.

FIGURE 14B

PROPOSED LONG BRANCH STREAM ENHANCEMENT LOCATIONS AND ACTIVITIES

Station Number	Activity
0+00 to 107+77	Remove invasives, repair eroded banks, plant riparian zone
0+00 to 2+00	Install culverted crossing or low water bridge, repair eroded banks, place boulders
2+00 to 3+30	Remove LWD*, re-vegetate banks
3+30	Install green gabions & VBP*
13+45 to 14+00	Remove LWD, push cobble pile to ldb*, install green gabions & VBP
15+60	Install green gabions & VBP
18+55 to 18+86	Install VBP & large boulders
20+00 to 20+75	Remove LWD, install VBP & J-Hook
20+88 to 22+00	Install envirologs or VBP
25+50 to 27+64	Install random or cluster boulders and/or step pools
27+64 to 31+30	Install random or cluster boulders and/or step pools
31+30 to 32+35	Reposition cobber deposition to create sinuosity, install boulders
34+30 to 37+85	Install green gabions, VBP, root-wads, & random boulders
40+00	Install culvert to allow proper flow from trib into Long Branch
41+25 to 42+60	Remove LWD, install green gabions & VBP
46+95 to 47+11	Install envirologs or large boulders under ldb
51+90	Repair culvert & install bank structures on ldb
52+50 to 53+00	Install random or cluster boulders and/or step pools
54+10 to 55+00	Install random or cluster boulders and/or step pools
56+40	Install culverted crossing or low water bridge, repair eroded banks, place boulders
56+75 to 56+95	Install random or cluster boulders and/or step pools
57+30 to 58+30	Install green gabions & VBP
58+60 to 59+35	Install VBP
60+25	Install green gabions & VBP
61+45	Install random or cluster boulders and/or step pools
62+00	Install culverted crossing or low water bridge
62+60 to 64+60	Install random or cluster boulders and/or step pools
65+00 to 66+50	Remove channel enclosure and concrete rails, repair banks, install boulders
66+60 to 67+80	Install random or cluster boulders and/or step pools
67+80	Install culverted crossing or low water bridge
68+35	Determine location of trib & install culvert
70+20	Install green gabions and VBP
70+65	Install boulders under unstable bank
71+60 to 73+50	Remove LWD & install VBP and boulders
73+70	Remove abandoned culvert
73+90	Remove concrete pillars on bank, install VBP
75+00	Remove culvert or cut culvert closer to bank & install boulders
75+40	Install boulders under banks to provide energy dissipater
75+85 to 80+00	Install green gabions &VBP, remove LWD, install random boulders
80+30	Install step pool under waterfall
84+00 & 84+50	Remove LWD & large appliances
85+00 to 88+00	Install random or boulder clusters and/or step pools
88+25	Remove LWD & large appliances
88+60 to 89+50	Install random or boulder clusters and/or step pools
91+00 to 92+85	Install VBP & boulders along both banks
94+45 to 95+00	Install boulders along rdb
97+75 to 101+55	Install green gabions & VBP
100+55 to 103+00	Install random or cluster boulders and/or step pools
103+00	Push cobble pile to bank & install J-Hook
103+50	Install boulders under unstable bank
104+65 to 106+00	Install random or cluster boulders and/or step pools
106+60	Install boulders on outside bends of channel

*LWD Large Woody Debris

*VBP Vegetated Bank Protection

*ldb left descending bank

*rdb right descending ban

FIGURE 14C