JOINT
PUBLIC NOTICE

CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A Hagood Avenue
Charleston, South Carolina 29403-5107
and
THE S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Office of Environmental Quality Control
Water Quality Certification and Wetlands Programs Section
2600 Bull Street
Columbia, South Carolina 29201

REGULATORYDIVISION
Refer to: P/N # 2008-0071-2IT

25 January 2008

Pursuant to Sections 401 and 404 of the Clean Water Act (33 U.S.C. 1344), and the South Carolina Coastal Zone Management Act (48-39-10 et.seq.) an application has been submitted to the Department of the Army and the S.C. Department of Health and Environmental Control by

HOLCIM INC.
C/O SYNTERRA
148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601

for a permit to construct a new stream channel and reroute water flow from an existing diversion canal to the new stream channel in

HOME BRANCH

at a location described as being within the Holcim Inc. facility on SC Highway 453 North in Holly Hill, Orangeburg County, South Carolina (33.29221 Latitude/ 80.42532 Longitutde)

In order to give all interested parties an opportunity to express their views

N O T I C E

is hereby given that written statements regarding the proposed work will be received by both of the above mentioned offices until

12 O'CLOCK NOON, MONDAY, FEBRUARY 25, 2008

from those interested in the activity and whose interests may be affected by the proposed work.

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Refer to: P/N # 2008-0071-2IT

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The proposed work consists of re-routing the water flow of Home Branch from the existing 15,000 linear foot diversion canal to a newly constructed 5,800 linear foot stream channel through the Holcim facility. The proposed stream channel will be constructed primarily by excavating uplands for most of the channel length. However, construction of the portion of the channel located between the conveyor overpass and the coal pile will require refilling a section of the quarry with approximately 1 million cubic yards of clay soil at a slope of 3.5:1 to an elevation of approximately 70 ft. While the existing diversion canal is a 20ft wide and 20ft deep upland dug canal that borders the Holicm property, the proposed stream channel will follow Rosgen's type C stream criteria, and where possible, a more natural stream channel with an inner channel and associated floodplains will be incorporated. The widths of the floodplains vary from 15 feet to 133 feet, depending on available space. Vegetation to be planted within the floodplains includes various native species indicative to the area and position within the floodplain. The proposed stream channel was designed to accommodate a predicted 100-year flow rate with a 10' minimum cross-section height. In addition, an emergency spillway has also been incorporated into the project design to accommodate flow from an event greater than a 100 yr storm. Please note that the proposed route of the new stream channel will be similar to the historical flow route of Home Branch prior to development of the quarry and resulting stream diversion.

To maintain existing hydraulic conditions of Home Branch system to the north of the Holcim plant, a wooden W-shaped weir will be installed at the start of the new channel. Once the stream channel is constructed and sufficient vegetation has been established, Holcim will abandon the existing diversion canal. The flow will be blocked by constructing an earthen embankment against a set of existing culverts located near the northeast corner of the property. No wetlands will be impacted by any portion of the proposed project. Details of the proposed project are shown in the project drawings.

The purpose of the project include the following: 1) To minimize the current safety hazards associated with the potential collapse of the existing diversion canal and resulting flooding of the quarry; 2) To reduce energy consumption, air emissions, and operating costs of cement manufacturing as moisture content has increased as mining activities have approached the canal; and 3) To improve the overall environmental quality of Home Branch.

NOTE: Plans depicting the work described in this notice are available and will be provided, upon receipt of a written request, to anyone that is interested in obtaining a copy of the plans for the specific project. The request must identify the project of interest by public notice number and a self-addressed stamped envelope must also be provided for mailing the drawings to you. Your request for drawings should be addressed to the

U.S. Army Corps of Engineers
ATTN: REGULATORY DIVISION
69A Hagood Avenue
Charleston, South Carolina 29403-5107.

REGULATORYDIVISION 25 January 2008
Refer to: P/N # 2008-0071-2IT

The District Engineer has concluded that the discharges associated with this project, both direct and indirect, should be reviewed by the South Carolina Department of Health and Environmental Control in accordance with provisions of Section 401 of the Clean Water Act. As such, this notice constitutes a request, on behalf of the applicant, for certification that this project will comply with applicable effluent limitations and water quality standards. The work shown on this application must also be certified as consistent with applicable provisions of the South Carolina Coastal Zone Management Act (15 CFR 930). The District Engineer will not process this application to a conclusion until such certifications are received. The applicant is hereby advised that supplemental information may be required by the State to facilitate the review. Persons wishing to comment or object to State certification must submit all comments in writing to the S.C. Department of Health and Environmental Control at the above address within thirty (30) days of the date of this notice.

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Implementation of the proposed project would impact acres upstream of estuarine substrates and emergent wetlands utilized by various life stages of species comprising the red drum, shrimp, and snapper-grouper management complexes. Our initial determination is that the proposed action would not have a substantial individual or cumulative adverse impact on EFH or fisheries managed by the South Atlantic Fishery Management Council and the National Marine Fisheries Service (NMFS). Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the NMFS.

The District Engineer has consulted the most recently available information and has determined that the project will have no effect on any Federally endangered, threatened, or proposed species and will not result in the destruction or adverse modification of designated or proposed critical habitat. This public notice serves as a request to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for any additional information they may have on whether any listed or proposed endangered or threatened species or designated or proposed critical habitat may be present in the area which would be affected by the activity, pursuant to Section 7(c) of the Endangered Species Act of 1973 (as amended).

Pursuant to Section 106 of the National Historic Preservation Act (NHPA), this public notice also constitutes a request to Indian Tribes to notify the District Engineer of any historic properties of religious and cultural significance to them that may be affected by the proposed undertaking.

In accordance with the NHPA, the District Engineer has also consulted the latest published version of the National Register of Historic Places for the presence or absence of registered properties, or properties listed as being eligible for inclusion therein, and this worksite is not included as a registered property or property listed as being eligible for inclusion in the Register. To insure that other cultural resources that the District Engineer is not aware of are not overlooked, this public notice also serves as a request to the State Historic Preservation Office to provide any information it may have with regard to historic and cultural resources.

REGULATORYDIVISION 25 January 2008
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Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for a public hearing shall state, with particularity, the reasons for holding a public hearing.

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the project must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the project will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production and, in general, the needs and welfare of the people. A permit will be granted unless the District Engineer determines that it would be contrary to the public interest. In cases of conflicting property rights, the Corps of Engineers cannot undertake to adjudicate rival claims.

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 activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this project. 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 activity.

If there are any questions concerning this public notice, please contact Tracy C. Dotolo at 843-329-8044 or toll free at 1-866-329-8187.

1.0 PROJECT OVERVIEW

Holcim (US) Inc. operates a limestone quarry and cement manufacturing plant south of Holly Hill, Orangeburg County, South Carolina (**Figure 1-1**) and adjacent to Four Hole Swamp (**Figure 1-2**). Prior to mining, Home Branch, a tributary stream to Four Hole Swamp, flowed through what is now the Holly Hill quarry (**Figure 1-2**). In conjunction with quarry development in the late 1970s or early 1980s, Home Branch was rerouted around the Holly Hill quarry in order to divert water away from mining operations. This was achieved by constructing a manmade diversion canal along the property line and creating a new discharge point into Four Hole Swamp (**Figure 1-3**).

Home Branch is designated as waters of the United States. Much of the Home Branch system, both upstream of and on Holcim property, has been modified by ditching and straightening. Limited stretches of the channel on Holcim property, north of the plant, appear to remain in the original configuration.

Holcim is proposing to relocate Home Branch diversion canal to a new stream channel designed to more closely resemble a natural representative stream in pattern, profile and dimension. The following document addresses Clean Water Act Section 404 permit requirements to provide the US Army Corps of Engineers (COE) with the information necessary to evaluate and approve the project.

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT Sheet 2 OF 57

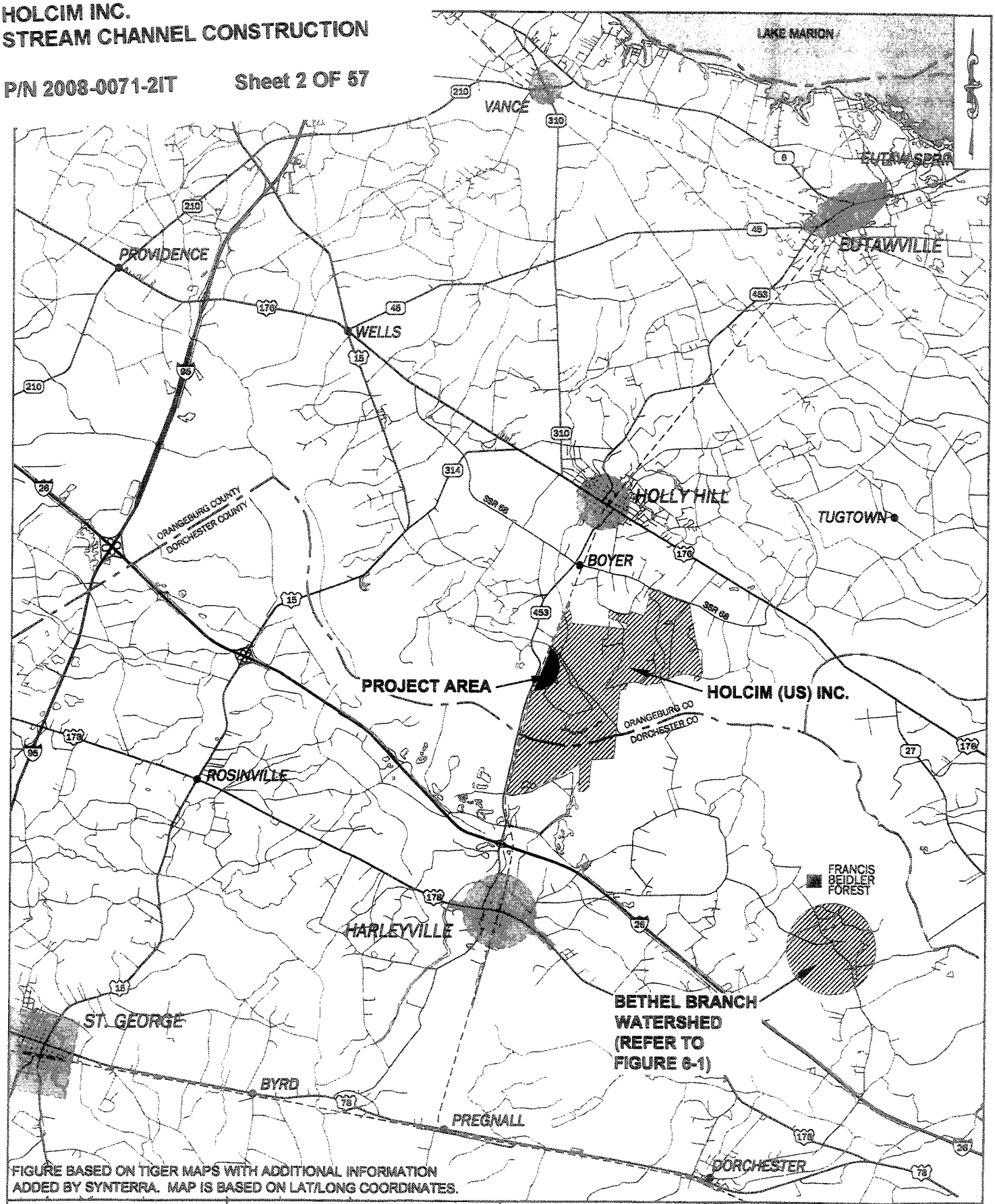

FIGURE BASED ON TIGER MAPS WITH ADDITIONAL INFORMATION ADDED BY SYNTERRA. MAP IS BASED ON LAT/LONG COORDINATES.

synTerra

GRAPHIC SCALE
6000 0 6000 12000
SCALE: 1" = 12000'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: FIGURE 1-1-SITE LOC
ORIGINAL DATE: 07/18/2007
REVISED DATE: 07/18/2007
REV: A

01/08/2008 11:19 AM P:\HOLCIM.367\04.ASSESS\20.HOME BRANCH SECTION 404\dwg\AERIAL FIGURES 1,2,3,4,5,6.dwg

FIGURE 1-1
LOCATION MAP
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

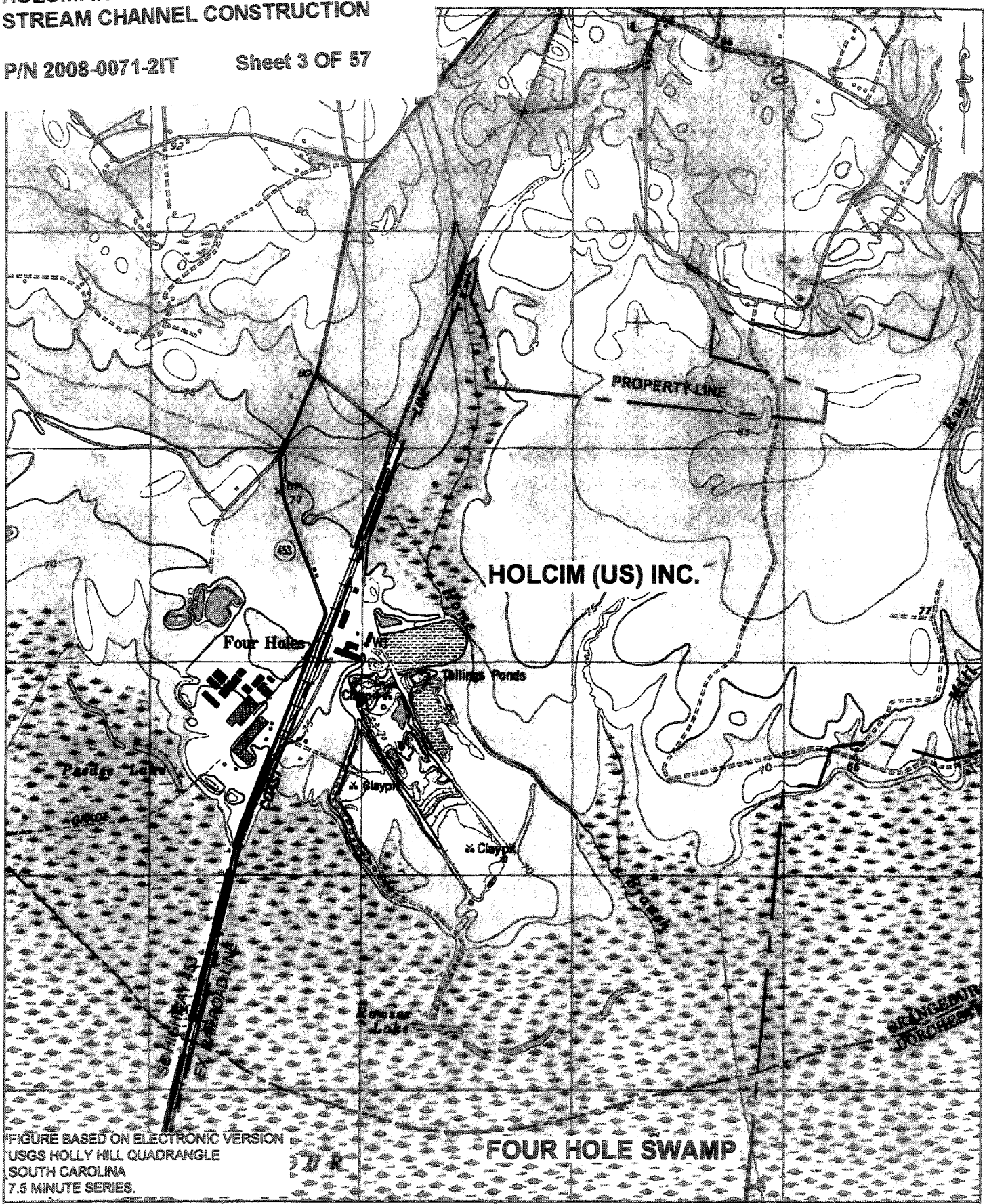

FIGURE BASED ON ELECTRONIC VERSION
USGS HOLLY HILL QUADRANGLE
SOUTH CAROLINA
7.5 MINUTE SERIES.

GRAPHIC SCALE
250 0 250 500
SCALE: 1" = 500'

148 RIVER STREET, SUITE 220
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www.synterracorp.com

DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: FIGURE 1-2-USGS
ORIGINAL DATE: 06/22/2007
REVISED DATE: 06/22/2007
REV: A

01/03/2008 11:40 AM P:\HOLCIM.367\04.ASSESS\20.HOME BRANCH SECTION 404\dwg\AERIAL FIGURES 1,2,3,4,5,6.dwg

FIGURE 1-2
USGS TOPOGRAPHIC MAP
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT Sheet 4 OF 57

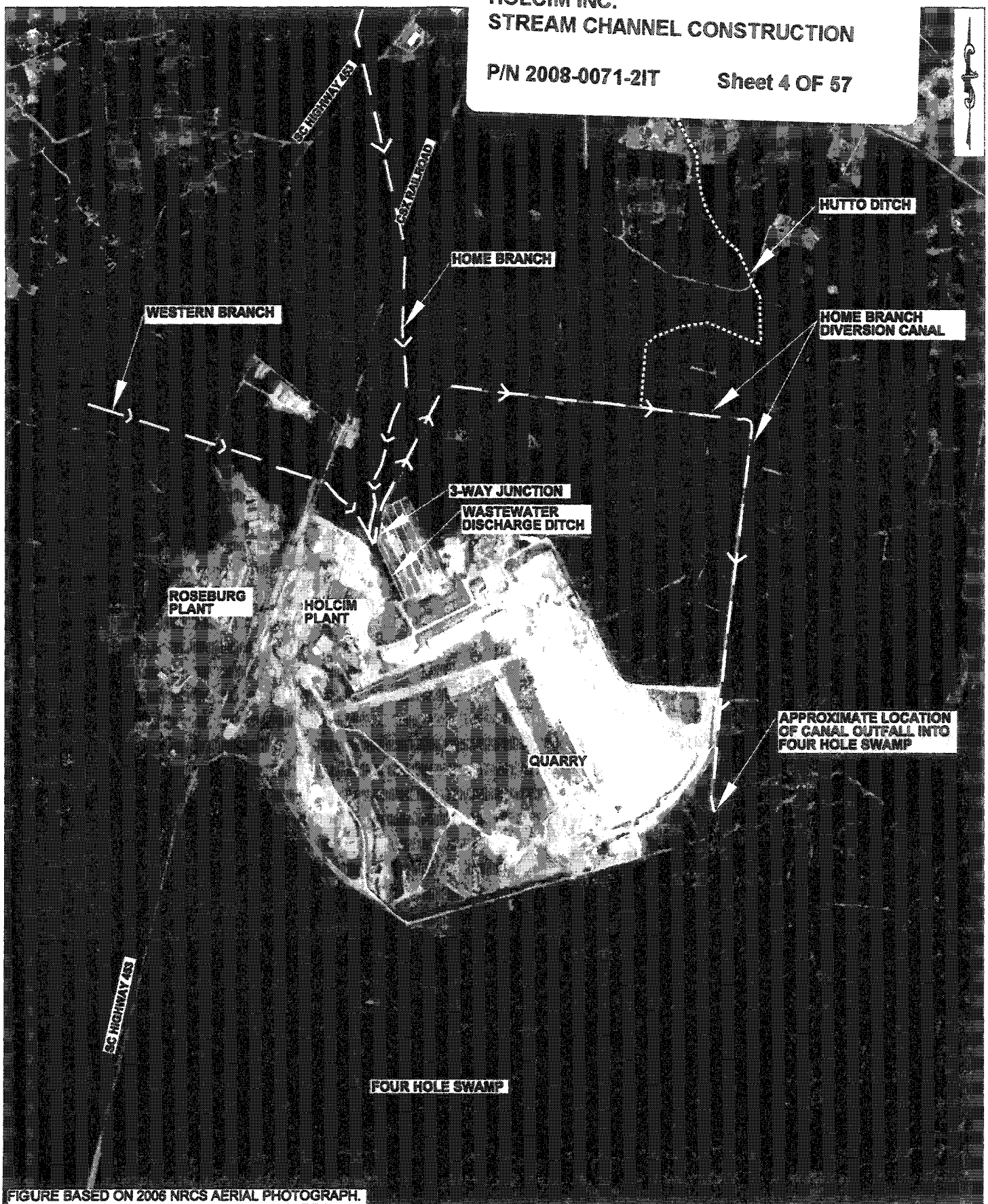


FIGURE BASED ON 2006 NRCS AERIAL PHOTOGRAPH.

GRAPHIC SCALE
1000 0 1000 2000
IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. CHASTAIN DATE: 01/25/2007
PROJECT MANAGER: MARK TAYLOR
LAYOUT: FIG 1-3 NEW HOME BRANCH ROUTE

01/03/2008 1:37 PM P:\HOLCIM.367\04.ASSESS\20.HOME BRANCH SECTION 404\dwg\HOME BRANCH RELOCATION.dwg

FIGURE 1-3
EXISTING SITE CONDITIONS
2006 NRCS AERIAL PHOTOGRAPH
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

2.0 NATURE OF ACTIVITY

This 404 Permit Application addresses the proposed relocation of Home Branch diversion canal and describes how this activity will affect waters of the United States. The proposed relocation will not impact any jurisdictional wetlands, but will affect approximately 15,000 linear feet of stream, since the Home Branch diversion canal is designated as waters of the United States.

The Holcim facility is adjacent to Four Hole Swamp (**Figure 1-3**) and includes an open pit quarry, a Portland cement manufacturing complex, and additional facilities for manufacturing, packaging, and shipping cement products. The existing diversion canal was constructed in the late 1970s or early 1980s to divert water away from mining operations. The diversion canal intercepts Home Branch near the processing facility and diverts the stream north to the property line, then east to the property corner, and finally south to Four Hole Swamp (**Figure 1-3**). The canal was constructed in straight segments through upland areas and is approximately 15,000 feet in length, 20 feet in width, and 20 feet in depth. It is not a natural stream channel, lacking floodplains and the changes in depth, width, and sinuosity that a natural stream would exhibit. The risk of collapse of the existing diversion canal wall into the adjacent quarry necessitates the relocation of this canal and hence impact on waters of the United States.

Holcim is proposing to relocate Home Branch diversion canal to a new stream channel designed to more closely resemble a natural representative stream in pattern, profile and dimension. Numerous routes were investigated and their feasibility evaluated based on environmental, economic, safety, and logistic considerations. The route and design of the proposed channel were restricted by the location of existing process equipment and the proximity of current and future mining operations. Although the proposed channel does not mirror Home Branch reference reach, it was designed to vastly improve on the existing diversion canal. The proposed channel would more closely follow the original, more direct flow to Four Hole Swamp. Wherever possible, sinuosity has been incorporated into the design. In addition, floodplains would be included where possible and a hardwood woodland buffer would be established along most of the route. This would enhance wildlife and plant habitat, resulting in an increase in species diversity.

Following the completion of the proposed stream channel and sufficient vegetative establishment, Holcim proposes to abandon the diversion canal. Flow through the existing canal would be blocked at a set of culverts near the northeast corner of the property. An earthen dam would be constructed against the culverts, on the up-stream side, impacting 10 linear feet of stream. Off-site storm water, mainly from Hutto ditch (**Figure 1-3**), which collects in the diversion canal would then flow to the proposed stream channel.

3.0 PROJECT PURPOSE AND JUSTIFICATION

The purpose and need to relocate Home Branch diversion canal is justified by safety, economic, and environmental considerations. The proposed relocation of the diversion canal would play a critical role in quarry water management as it would significantly reduce current groundwater infiltration into the quarry from the canal.

The primary consideration of the proposed project is to minimize the current safety hazards associated with the potential collapse of the existing diversion canal and resulting flooding of the quarry. The diversion canal might undergo structural failure due to the removal of supporting material or by means of piping through porous soils, either of which could result in the diversion of stream flow into the quarry. The instability of the diversion canal wall, along with potential flooding of the quarry, would threaten the safety of employees and equipment. Environmental damage could also result, as flow into Four Hole Swamp could be interrupted for an extended period of time until the breach could be repaired.

Secondly, energy consumption, air emissions, and operating costs of cement manufacturing would be significantly reduced by relocating the diversion canal. Moisture content of raw material has increased substantially (18 to 21 percent) as mining operations have approached the existing diversion canal. This has a negative environmental and economic impact due to the extra fuel required in the kiln to remove excess moisture. For every one percent reduction in moisture content of raw material, there would be a saving of at least $270,000 per year for fuel and related reduction in coal consumption and emissions. Finally, the obstruction of the diversion canal would be eliminated should mining operations need to expand to the east of the canal.

In addition, relocating the diversion canal using a more natural stream pattern would vastly improve on the existing degraded Home Branch canal ecosystem by restoring flow direction and incorporating sinuosity, floodplains and woodland buffers, where possible. An additional benefit would be the enhancement of habitat for indigenous animal and plant species and a resultant increase in species diversity.

4.0 EXISTING CONDITIONS

Existing hydrologic and ecosystem conditions were appraised for Home Branch Watershed, Home Branch, and the existing diversion canal. This provided a basis to understand prevailing conditions as well as assess the condition of the Home Branch system. An overview of current conditions within the quarry is also presented.

4.1 Home Branch Watershed and Stream

The watershed that produces all flows to Home Branch, Home Branch tributaries, and the existing diversion canal has an area of 12 square miles or 7,500 acres (United States Geological Survey quadrangle sheets). The watershed is close to nine miles in length from north to south and averages two miles in width from west to east (**Figure 4-1**). Topographic elevations within the watershed range from approximately 125 feet just north of Holly Hill to 62 feet at the entrance to Four Hole Swamp. The resulting average slope of Home Branch is approximately 0.1 percent.

Soil types within the watershed are diverse. According to Natural Resource Conservation Service (NRCS) Orangeburg Soil Survey Maps, Home Branch channel consists primarily of the type D Mouzon Fine Sandy Loam soil. The adjacent floodplains and remaining watershed range from type A soils, such as Bonneau Sand, to type D soils, such as Coxville Sandy Loam (**Figures 4-2a** and **4-2b**). There is a noticeable difference in the soil regime within the watershed. The area north of Holly Hill contains mostly type B soils. The Holly Hill area and the portion south of Holly Hill have more diverse soils, but the soils are on average more permeable compared to those north of Holly Hill. Therefore, soil permeability increases from the northern to southern portion of the watershed.

It is in the Holly Hill area that the contributing watershed consolidates enough water to create Home Branch. From Holly Hill, Home Branch flows south under Boyer Road (State Road 68), SC Highway 453, and CSX Railroad. A small tributary, Western Branch, joins Home Branch just before it enters the diversion canal. The point where Home Branch, Western Branch and the diversion canal meet is referred to as Three-way Junction. Home Branch then enters the diversion canal, which conveys and empties the flow into Four Hole Swamp, approximately 1.5 miles east of SC Highway 453 (**Figure 1-3**). The base flow of Home Branch at the diversion canal fluctuates between approximately 25 cfs and 100 cfs. The calculated 2-year and 100-year storms were determined to flow at approximate rates of 120 cfs and 1,000 cfs, respectively. Although

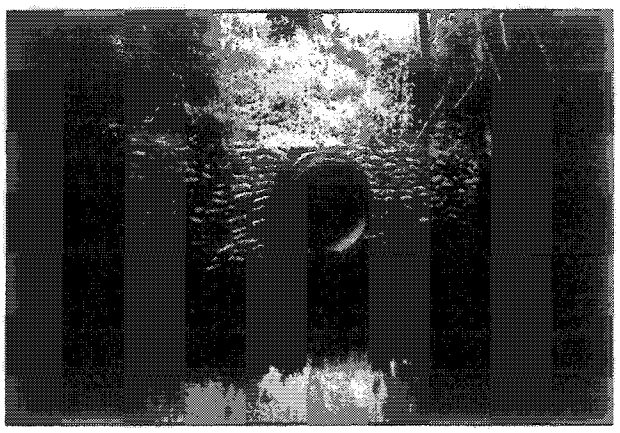
the flow rates are high, velocities remain low due to the extremely gradual slope of the area. Therefore, the erosive effects of typical high flow situations do not exist.

The natural stream system of Home Branch has been severely degraded through urbanization. In the early 1700s, the first settlers in the Orangeburg District were traders and scattered grazers. By the mid-1700s, agriculture became prominent with wheat, corn, hemp, flax, and cotton being grown. A strong agricultural base was formed and in the twentieth century a thriving textile industry was developed. More recently, cotton has been replaced by timber. These changes in land use within the watershed, from grazing to agriculture and then industrialization and forestry, have had a detrimental affect on streams of the region. Furthermore, draining, ditching, and straightening have also degraded streams. Urban development in and around the town of Holly Hill has resulted in unnatural stream flows and pollutant-laden storm water run-off. In addition, development has eradicated the natural sinuosity, floodplains, and associated biodiversity of this system. The degradation of Home Branch near Holly Hill has greatly impacted the lower stream system and its associated floodplains. The construction of roads and railway lines has also altered the hydrology of the stream.

Watershed modification, stream channelization, floodplain restrictions, loss of riparian vegetation, and altered hydrology have changed the dimension, pattern, and profile of streams and thus their function and habitat. Although the majority of Home Branch stream system has been modified, limited stretches appear to remain in the original configuration.

4.2 Existing Home Branch Diversion Canal

The diversion canal that borders most of Holcim quarry was constructed by intercepting Home Branch near the cement plant. The diversion canal was constructed through upland areas in straight segments. It initially traverses north for 3,500 feet, then east for 5,000 feet to the property corner, and finally turns south for 6,000 feet where it empties into Four Hole Swamp (**Figure 1-3**). The diversion canal measures almost 15,000 feet in length and approximately 20 feet in width, and 20 feet in depth. A road crossing, comprised of a concrete-reinforced earthen embankment with three 72-inch diameter culvert pipes (**Photograph 4-1**), crosses the diversion canal near the northeastern corner.



Photograph 4-1. Existing culvert near northeastern corner of property

Most of the water that the diversion canal carries is provided by Home Branch. Surrounding groundwater, a ditch, referred to as Hutto ditch (**Figure 1-3**), that drains approximately 0.35 square miles to the north of the diversion canal, and treated wastewater from the Holcim plant also provide water to the canal. The slope along the diversion canal is negligible. From the point where the diversion canal begins to the northeast corner, a distance of 8,000 feet, there is a drop in elevation of only 0.1 foot. Over the last 6,000 feet, where the diversion canal turns south, there is an additional drop in elevation of three feet. The flow of the diversion canal is, therefore, provided by pressure buildup due to the backwater effect of the canal, rather than the slope of the canal. This flow regime results in relatively deep water at the beginning of the diversion canal compared to relatively shallow water towards the end of the diversion canal.

The diversion canal is characterized by excavated slopes of one horizontal to one vertical (1:1) and steeper, which have severely restricted the riparian zone and floodplains associated with naturally occurring systems. This has resulted in an increased potential of relatively high velocity flows through the canal and at the discharge point. This has also limited fish and wildlife habitat with consequential loss of species diversity.

4.3 Quarry

Holcim mines clay and limestone for the cement making process from the on-site quarry. The clay soils occur from the surface to a depth of approximately 30 feet. The limestone, which is poorly consolidated over most of its thickness, ranges from approximately 40 to 70 feet in thickness.

The quarry operates under South Carolina Department of Health and Environmental Control (DHEC) surface mining Permit Number 54. Water discharged from the quarry is regulated by DHEC individual Permit Number SC0002992 and General Permit Number SCG730000.

4.3.1 Geology

The Holcim facility is located in the Coastal Plain geologic province of South Carolina, approximately 40 miles inland from the Atlantic Ocean. According to Harris and Zullo (1991, p.258), the quarries in Berkeley, Orangeburg and northern Dorchester counties are developed in the Cross Formation of Upper Eocene age. The Cross Formation uncomfortably overlies the Middle Eocene Santee Limestone (**Figure 4-3**).

The Cross Formation is underlain by the Santee Formation, Tertiary age limestone that is contiguous with limestone deposits in southern Georgia and Florida. A low-permeability shale layer that ranges from approximately 15 to 30 feet in thickness separates the Cross Formation from the Santee. This unit acts as an aquitard, resulting in confined (artesian) aquifer conditions in the Santee.

The origin of the sandy clays that overly the Cross Formation at the Holcim site has not been determined. Field observations indicate that the clay formed as a result of the weathering of the underlying limestone. The clay deposits are not lithified, and are of undetermined age.

4.3.2 Mining Methods

Ground surface elevations in the vicinity of the quarry range from 70 to 90 feet above mean sea level (MSL). The base of the quarry lies at elevations ranging from 15 feet MSL to sea level, with a general slope to the southeast. Current production methods involve removing clay from the top of the limestone with excavators and off-road haul trucks. A portion of the clay is used in the cement manufacturing process, and surplus clay is used for construction purposes and to reclaim completed areas of the quarry.

At present, limestone is mined using a bucket-wheel excavator (BWE), a type of continuous miner. The BWE, which can remove roughly 35 vertical feet of material at the mining face, is used to cut an upper bench (first pass) before mining a second pass to the quarry floor. The resulting quarry is 50 to over 70 feet below ground surface.

4.3.3 Dewatering

Groundwater infiltrates slowly into the quarry from the surrounding formation. Surface water that falls into the quarry (currently over 300 acres in extent) and drains from mine areas adjacent to the quarry is routed to one of three sumps in the quarry floor. Quarry dewatering water from the active quarry area accumulates in a sump near the southeast corner of the quarry and is discharged to Four Hole Swamp via a settling basin that is permitted under Permit Number SCG730000. Groundwater and surface water that accumulates in the inactive areas of the quarry near the cement plant is discharged through the plant wastewater treatment system under DHEC Permit Number SC0002992.

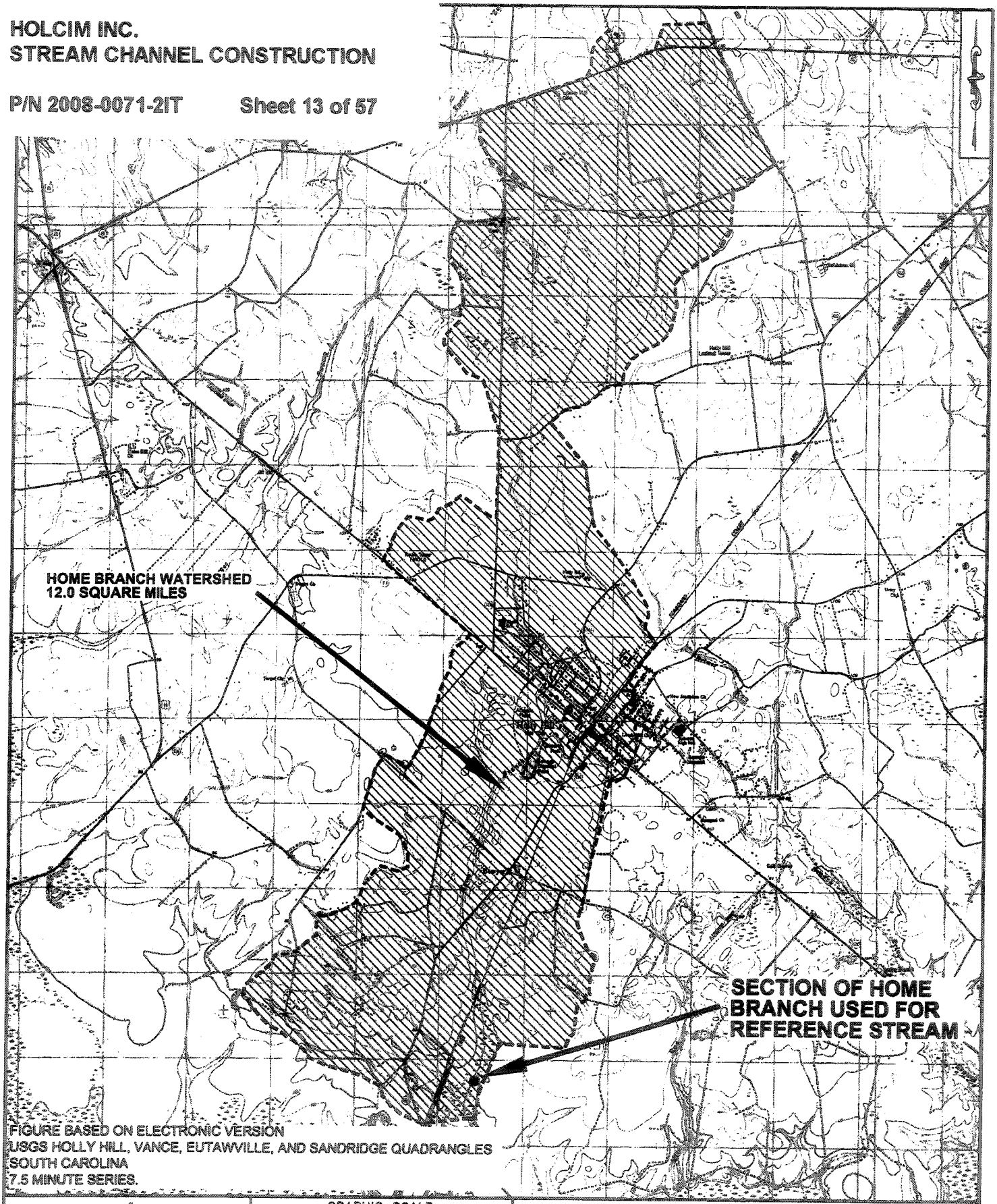


FIGURE BASED ON ELECTRONIC VERSION
USGS HOLLY HILL, VANCE, EUTAWVILLE, AND SANDRIDGE QUADRANGLES
SOUTH CAROLINA
7.5 MINUTE SERIES.

GRAPHIC SCALE
2500 0 2500 5000
IN FEET

148 RIVER STREET, SUITE 220
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PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: JCHASTAIN DATE: 12/29/2008
PROJECT MANAGER: MARK TAYLOR
LAYOUT: FIG 4-1 (HOME BRANCH AT CANAL) ORIGINAL

01/03/2008 1:27 PM P:\HOLCIM.367\04.ASSESS\20.HOME BRANCH SECTION 404\dwg\BRANCH WATERSHED REV A.dwg

FIGURE 4-1
HOME BRANCH WATERSHED
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT Sheet 14 of 57

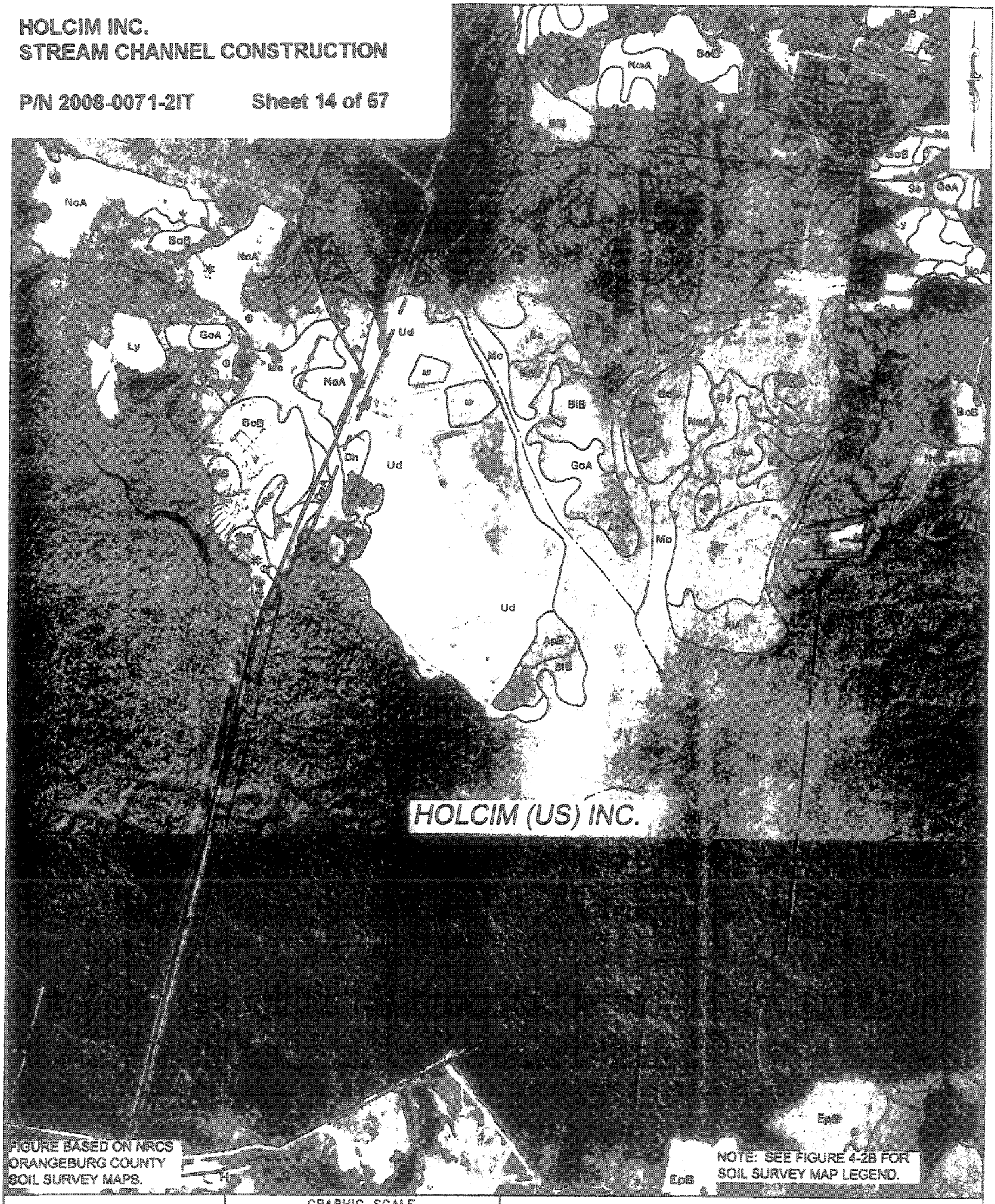

FIGURE BASED ON NRCS ORANGEBURG COUNTY SOIL SURVEY MAPS.

NOTE: SEE FIGURE 4-2B FOR SOIL SURVEY MAP LEGEND.

GRAPHIC SCALE
250 0 250 500
SCALE: 1" = 500'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: FIGURE 4-2A-SOIL MAP
ORIGINAL DATE: 05/22/2007
REVISED DATE: 05/22/2007
REV: A

01/03/2008 1:49 PM P:\HOLCIM.367\04.ASSESS\20.HOME BRANCH SECTION 404\dwg\AERIAL FIGURES 1,2,3,4,5,6.dwg

FIGURE 4-2A
SOIL SURVEY MAP
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

5.0 ALTERNATIVE CHANNEL ROUTES

In addition to the proposed channel route, a number of alternative routes (**Figure 5-1**) were investigated and their feasibility evaluated based on environmental, economic, safety, and logistic considerations. The options of alternative routes were restricted by the location of existing highways, railroads, process equipment, buildings, and the proximity of current and future mining operations. In addition, there is only a two foot vertical fall between the bottom elevation of Home Branch north of the plant and the bottom elevation of Four Hole Swamp south of the plant. This lack of vertical fall significantly restricted options for the relocation of Home Branch diversion canal.

The proposed channel would begin near the processing facility, where the diversion canal currently intercepts Home Branch at Three-way Junction (**Figure 5-1**). The channel would then flow south adjacent to the quarry to a new discharge point at Four Hole Swamp. Alternative routes that were considered are discussed in the following sections.

5.1 Alternative 1: Rerouting West of Roseburg Property

This route would start north of the plant, going west along the Western Branch tributary, under CSX Railroad and SC Highway 453, for approximately 5,000 feet. Once beyond Roseburg (formerly Georgia-Pacific) property, a constructed channel would run due south for approximately 3,500 feet to Four Hole Swamp (**Figure 5-1**).

Upon thorough investigation of Western Branch, it was determined that this proposal was not viable. The gradient of Western Branch would have to be altered in order to run water back up the stream channel. Since the existing stream channel would be completely altered by trenching, the negative environmental impact on this tributary would be severe. The constructed channel would further damage approximately 3,500 linear feet of the landscape, most of which are wetlands. Furthermore, construction of this alternative would result in an increased potential of flooding to the north Holcim property. The water elevation of Four Hole Swamp on the upstream side (west) of SC Highway 453 is greater than on the downstream (east) side, since the Highway acts as a dam. Thus the increased potential for water to back-up and flood the area north of Holcim would be significant.

5.2 Alternative 2: Rerouting Through Roseburg Property

This route would start north of the plant, going due west along Western Branch tributary, under the CSX Railroad (as Alternative 1), for approximately 1,000 feet. Once beyond the railway line, a constructed channel would run due south (for approximately 5,500 feet) through the Roseburg facility to Four Hole Swamp (**Figure 5-1**).

Although this option was more feasible than the first alternative, it was determined to be hydraulically impossible. As Alternative 1, the gradient of Western Branch tributary would have to be altered in order to run water back up the stream channel. The environmental impact to the stream channel would be less than the first alternative simply because of the shorter distance needed to be altered. As Alternative 1, high water elevations in Four Hole Swamp on the west side of SC Highway 453 would restrict the discharge volume, which might increase potential flooding north of Holcim property. In addition, this alternative could not be further considered due to the unwillingness of Roseburg to relinquish their property.

5.3 Alternative 3: Rerouting Through Holcim Plant

This route would start where the diversion canal currently intercepts Home Branch at Three-way Junction, run west for approximately 900 feet, then south, parallel to SC Highway 453, through the packing and shipping area of the plant for approximately 4,000 feet (**Figure 5-1**).

This potential alternative would be extremely difficult to implement. Firstly, this is the busiest area of the plant, with high traffic flow. This route would also have a major impact on the infrastructure of the plant. Furthermore, this route would most probably need to be covered, *i.e.*, a concrete box culvert, for most of its length because of potential contamination from the plant. A box culvert would completely inhibit any form of natural habitat establishment.

5.4 Alternative 4: Rerouting Through Holcim Quarry - Aqueduct

This alternative would reroute Home Branch diversion canal to an earthen aqueduct through the existing quarry (**Figure 5-1**). The proposal would require capturing the entire volume of Home Branch and Western Branch in an elevated aqueduct across the quarry to a new discharge point at Four Hole Swamp. The aqueduct would need to be elevated approximately 65 feet above the existing quarry floor. The proposal would significantly increase safety concerns associated with mine operations and result in limited habitat for plants or animals.

5.5 Alternative 5: Rerouting East to Briner Branch

This route would start from the northeast corner of the diversion canal and run due east (toward US Highway 176) for approximately 12,000 feet until intercepting Briner Branch, a tributary stream to Four Hole Swamp (**Figure 5-1**). The lack of vertical fall from the northeast corner of the diversion canal to Briner Branch would require a channel of between 20 and 40 feet deep. Given the depth and length of the channel, the impact on the environment would be substantial.

For the technical, environmental, and economic reasons discussed above, the five alternative routes were discarded in favor of the proposed channel route described in **Section 7.6** and illustrated in **Figure 5-1** and **Figures 7-1** through **7-5**.

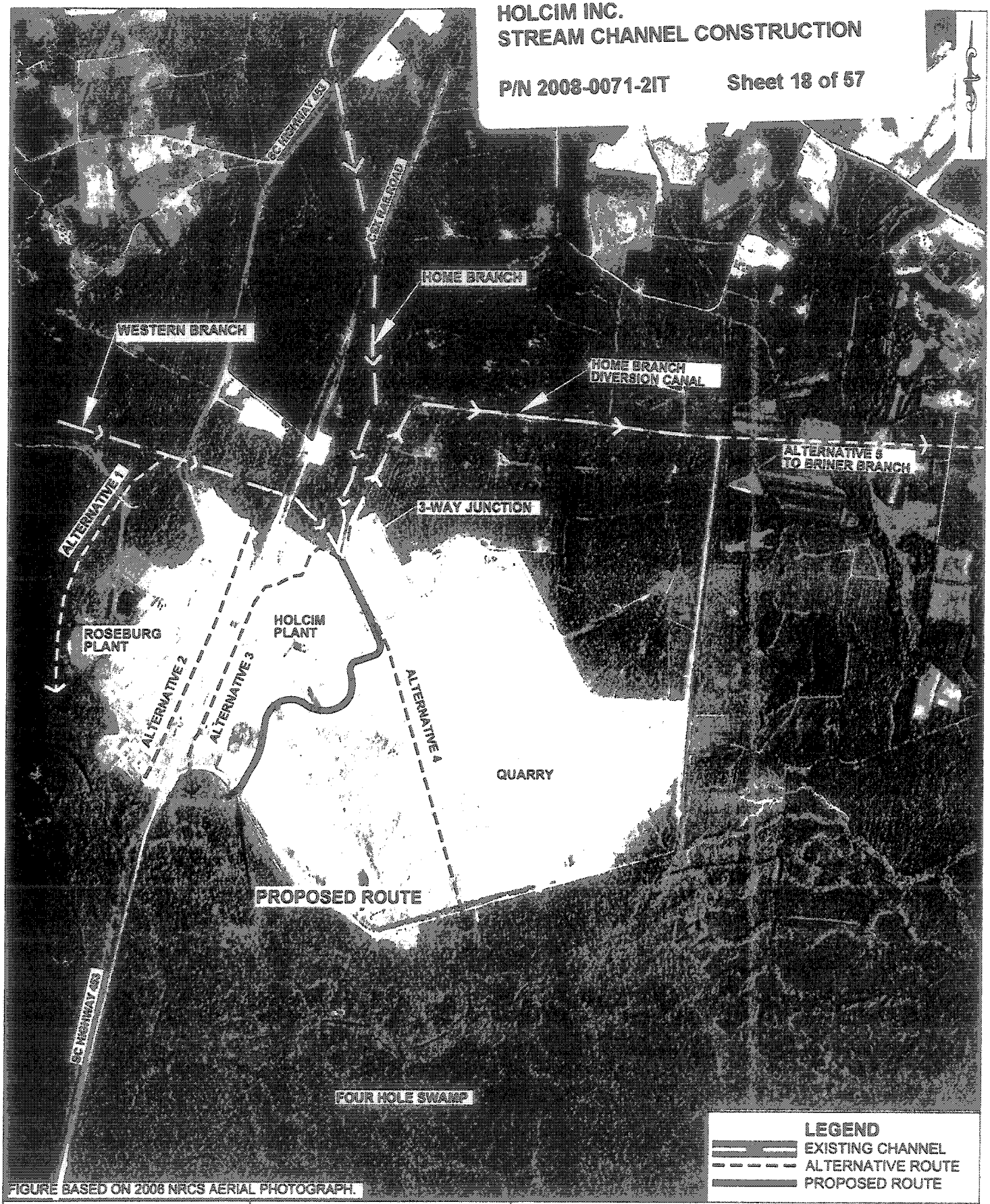

FIGURE BASED ON 2008 NRCS AERIAL PHOTOGRAPH.

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DRAWN BY: J. CHASTAIN DATE: 01/25/2007
PROJECT MANAGER: MARK TAYLOR
LAYOUT: FIG 5-1 NEW HOME BRANCH ROUTE

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FIGURE 5-1
PROPOSED AND ALTERNATIVE CHANNEL ROUTES
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

constraints, incorporating various obstacles in the design, and preventing untreated storm water from entering the channel.

An ideal design would have been to base the entire length of the proposed channel on the reference stream data and characteristics of a C-type stream (**Table 7.3; Figures 7-17** and **7-18**). However, because of the numerous constraints of existing mining and manufacturing operations this was not possible. Although the majority of the proposed channel has some features of C-type streams, it was only at the upstream portion of the proposed channel where sufficient space was available to incorporate a sinuosity comparable to that of the reference reach (**Figures 7-1** and **7-2**).

The detailed design of the entire length of the channel was modeled using HEC-RAS hydraulic software. This was done to increase the chances of success of the channel and verify that the proposed channel would not alter existing upstream hydraulic conditions.

7.5.1 Channel Type

The design of the proposed channel focused on constructing a C-type stream, with a width-to-depth ratio of 12, which tends to be more stable. In several areas it was possible to design the proposed channel with an entrenchment ratio greater than 2.2 by incorporating floodplains (**Figures 7-1** through **7-5**). At the upstream portion of the proposed channel, sinuosity would be approximately 1.1.

7.5.2 Channel Profile

There is a two-foot vertical fall between the bottom elevation of Home Branch north of the plant and the bottom elevation of Four Hole Swamp south of the plant. To aid in maintaining existing hydrology conditions of Home Branch, the longitudinal slope of the upper portion of the proposed channel would be zero. From there, the bottom elevation of the proposed channel would steadily decrease from 64 feet to 62 feet to align with the bottom elevation of Four Hole Swamp. The longitudinal slope would be 0.04 percent.

7.5.3 Channel Cross-sectional Designs

The first priority when designing the proposed channel was to ensure that flows producing a 100-year flood would be adequately conveyed from Home Branch to Four Hole Swamp. Once it was confirmed that the flow from a 100-year flood could be contained in a trapezoidal channel, the next priority was to design a more natural channel with associated floodplains. To create floodplains, an

inner channel was designed so that flows that would normally be contained within the banks would periodically increase to the point of spilling over onto the floodplains. Initially, the inner channel was designed to accommodate 2-year storm flows. The Soil Conservation Service (SCS) method computes a 2-year storm flow to be 124 cfs (**Table 7.4**). Using this flow rate, the inner channel would need to be approximately 70 feet wide by four feet deep, which is larger than the Home Branch inner channel of approximately 28 feet by three feet (refer to **Section 7.2; Table 7.2**).

Bankfull Hydraulic relationships for the North Carolina Coastal Plain streams compute a 1.1 year bankfull discharge of 99 cfs (**Table 7.1**) for the same size watershed. It was also observed in the field that even with high water surface elevations the flow rate was still only approximately 25 cfs. Therefore, in an attempt to allow for floodplains and not oversize the channel, the inner channel design was based on a flow rate of 99 cfs.

Various channel cross-sections were necessary to route the stream through several obstacles and constricted areas (**Figures 7-6** through **7-9**). Overall, the proposed channel was designed to accommodate a predicted 100-year flow rate of 1,025 cfs and maximum increase in water depth of eight feet (**Table 7.4**). An addition of two feet in height would provide a free-board above the predicted peak water depth. Thus, for the entire length of the channel, except at the emergency spillway, the minimum height of the cross-section would be 10 feet (**Figure 7-19**). The side slopes of the channel would be 2:1 (horizontal to vertical) for most of the length of the channel (**Figure 7-19**). In the backfill segment of the proposed channel (refer to **Section 7.5.6**), the eastern side slope would be 3:1 (horizontal to vertical) (**Figure 7-7**). Total channel width would vary, depending on available space.

Wherever possible, a more natural stream channel was created by designing an inner channel with associated floodplains (**Figure 7-19**). The inner channel was designed so that the floodplains would receive water once the flow rate exceeds 99 cfs. Thus the inner channel would be 30 feet wide, with an average depth of 2.5 feet (**Figure 7-19**). The slopes of the inner channel would range from 1:1 to 5:1 (horizontal to vertical). The width of the floodplains would depend on available space and would range from 15 feet to 133 feet.

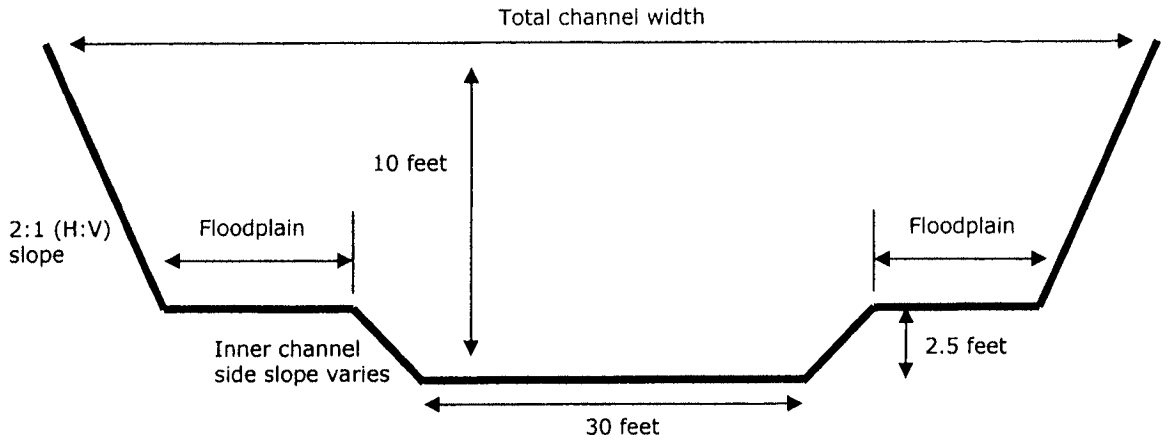


FIGURE 7-19. TYPICAL DESIGNED CROSS-SECTION OF THE PROPOSED CHANNEL

In very confined areas, such as the bridge overpass, a floodplain could not be incorporated and a trapezoidal channel with a 30-foot base and 10-foot depth would be required. The various channel cross-section designs are presented in **Figures 7-6** through **7-9**.

7.5.4 Emergency Spillway

The proposed channel would adequately convey 100-year storm flows of 1,025 cfs. However, for storm events greater than 100-year flows an emergency spillway would be installed (**Figures 7-3** and **7-7**). In addition, the spillway would provide flow relief if large debris became lodged within the channel. The capacity of the spillway would be as great as possible based on the restrictions of placement. With the current design, the emergency spillway would discharge approximately 240 cfs during 100-year storm events.

7.5.5 Inlet Control Structure

An inlet control structure was not desirable but was considered necessary to maintain existing hydraulic conditions of the Home Branch system north of Holcim plant. Constructing a channel through the Holcim plant site would convey water adequately from Home Branch to Four Hole Swamp. However, because the proposed channel is shorter than the existing diversion canal (approximately 5,800 feet *vs* 15,000 feet), future hydraulic conditions of Home Branch, north of the plant, would be different to current conditions. Numerous options were investigated to rectify this.

For a virtually flat channel to have flow and velocity, pressure must exist upstream to push water through the channel. Pressure increases as water depth increases. A longer channel accumulates a longer backwater distance and hence greater backwater depths. Since the proposed channel is shorter, both backwater distance and depth would be less. Consequently, the current depth in Home Branch that is necessary to push the flow through the existing diversion canal is deeper than would be necessary for the shorter proposed channel. Therefore, unless preventative measures are taken, Home Branch water depths upstream of the proposed channel would be less than they currently are, and Home Branch would drain quicker than it currently does during storm events. The consequence of this would be that the existing wetlands supported by the current hydraulic conditions might be at risk. The solution to reducing the impact of the proposed channel to these wetlands would be to install an inlet control structure at the start of the proposed channel.

The inlet control was designed to mimic current Home Branch water surface elevations at corresponding storm flow rates. Various options were evaluated and the design that would have the least impact on aquatic life was selected. Given that the proposed channel is designed to resemble a natural stream in the same watershed, it is predicted that over time an equilibrium will be established. Therefore, it was considered that a temporary structure would be more appropriate than a permanent structure. In addition, it is preferable that the structure be constructed of materials that naturally occur in streams of the area. Rocks do not constitute stream channel substrates in the area, and thus would be inappropriate to use as construction material. A "W – weir" constructed out of wood is therefore proposed as an inlet control structure (**Figures 7-12** through **7-15**). The structure would be placed at the start of the proposed channel (**Figure 7-2**), just downstream of Three-way Junction.

W – weirs are primarily used to enhance aquatic habitat by creating scour pools and variation in stream flow. They are also well suited for erosion control by redirecting stream flow away from the banks and contribute to overall stream stability. The use of natural materials, such as logs, eventually leads to a naturalistic structure as apposed to conventional concrete weirs which also block fish movement. W – weirs have been successfully used in a number of stream restoration projects, including the Darby Creek project in Pennsylvania (Salas, Albert, and Williams, 2005). Although W – weirs are more suited to wider

streams, with an inner channel of 40 feet or more, the design enabled the objectives to be met without restricting fish movement.

The W-weir was designed with the outer arm angles set 25 degrees from the bank edge with an approximate slope of 12 percent. The inner arms join the outer arms at a distance of approximately 7.5 feet from the bank edge. The weir measures 2.5 feet high at the highest point along the bank edge and 0.5 feet high at the lowest point. The weir would be 30 feet wide and 20 feet long. Footers on the W-weir would be set at 2 feet below the streambed. A plan view and cross-sections are illustrated in **Figures 7-12** through **7-15**.

7.5.6 Quarry Backfill

The proposed channel would require excavation for most of its length. However, between the conveyor overpass and the coal pile (**Figure 7-4**) backfill would be required. This posed a number of constraints to the stream channel design, namely limiting channel width and restricting the creation of floodplains.

Detailed soil property testing and geotechnical modeling were performed to be used as the basis for the design of the quarry backfill in the channel route. Because the majority of the backfill would be saturated with groundwater, the structure would be similar to a dam. Clay soils removed from the quarry area as overburden are suitable for construction of the fill. Specific design features that would be incorporated into the backfill include the following:

- Compaction to 95 percent of Standard Proctor density within two percent of the optimum moisture content
- Construction of the outboard slope of the backfill at 3½:1 (horizontal to vertical)
- Installation of a vertical chimney drain in the backfill to control the groundwater gradient between the location of the channel and the face of the fill (**Figure 7-20**)
- Installation of a blanket drain and toe drain system beneath the clay backfill (**Figure 7-20**)
- Benching of the existing quarry wall during placement of compacted backfill (**Figure 7-21**)

- Installation of a low-permeability synthetic liner beneath the channel at the locations where the channel transitions from natural soil to backfill.

- Use of select low-permeability clay materials in the channel and floodplain areas of the backfill

Construction details for these features are illustrated in **Figures 7-20A, 7-20B,** and **7-21.**

7.5.7 Outfall Area

An outfall area has the potential to be a scour zone, especially during large storm events. To avoid this, the bottom elevation of the proposed channel would be the same as that of Four Hole Swamp. In addition, the proposed channel would gradually widen from the railroad overpass to the outlet area (**Figure 7-5**). In order for the proposed channel to tie into Four Hole Swamp the excavation of old fill material adjacent to the swamp would be required.

7.6 Channel Route

The route of the proposed channel (**Figures 7-1** through **7-5**) was based on hydrologic, environmental, economic, safety, and logistic considerations. Over a distance of approximately 5,000 feet there is only a two-foot vertical fall between the bottom elevation of Home Branch north of the plant and the bottom elevation of Four Hole Swamp south of the plant. This lack of vertical fall significantly restricted options for the relocation of Home Branch (refer to **Section 4.0**).

Firstly, limits of construction were determined. The location of the existing diversion canal, existing process equipment, buildings, roads, railway lines, monitoring wells, and the proximity of current and future mining operations were restricting factors. The stability of the stream and potential flooding were two additional factors restricting the channel layout. Costs of excavating and backfilling were economic limitations.

Within the limits of construction, the actual layout of the proposed channel was then established (**Figures 7-1** through **7-5**). The proposed channel would begin near the processing facility, just south of where the diversion canal currently intercepts Home Branch stream. The channel would then flow south through the plant and quarry to a new discharge point at Four Hole Swamp.

7.7 Channel Vegetation and Stabilization

Natural parameters based on the Rosgen methodology were used to design the inner (bankfull) channel and floodplains of the proposed channel to replace the existing Home Branch diversion canal. The long-term stability of this design is dependent on the establishment of good vegetative cover.

The aim of establishing vegetation is to stabilize channel banks and enhance the quality of the environment in terms of fish and wildlife habitat. Natural channel design concepts rely on existing vegetation and effective re-vegetation to provide long-term bank stability, energy dissipation, sediment storage, habitat, and shade.

To restore the area to a condition similar to that of Home Branch, the project would include a comprehensive and aggressive vegetation plan. The vegetation plan would play an important part in meeting the objectives of this project, including:

- Re-establishment of indigenous vegetation
- Stabilize channel banks and slopes
- Minimize surface erosion, sedimentation, and associated off-site impacts
- Re-establish and enhance terrestrial, riparian, and aquatic habitat
- Be self-sustainable and require minimal remedial work or maintenance

At the upstream segemnt of the proposed channel, the western bank of the wastewater discharge ditch is stable and well vegetated with indigenous vegetation. Therefore, the design and layout of the proposed channel incorporated this bank. The remainder of the proposed channel would need to be vegetated and might require specific measures to minimize erosion, especially to reduce near bank stress during bankfull events. In an effort to restore a representative channel, vegetative erosion control measures would be utilized wherever possible. However, specific sections of the proposed channel might require structural stabilization. Bioengineering, which blends structural and vegetative stabilization methods, would be used in preference to hard armoring. Hard armoring in the form of concrete flutes could not be avoided at the bridge, railroad, and conveyor overpasses.

7.7.1 Vegetation Selection

The vegetation plan aims to initiate the processes that provide for a diverse and self-sustaining plant community and ecosystem. Although no vegetation plan is capable of precisely replicating a natural, undisturbed plant community, this plan would aid in the restoration of the ecosystem and reintroduce biological diversity to the project area.

A vegetation inspection of Home Branch reference reach was conducted to determine the choice of plants to be used for bank stabilization and vegetation of the proposed channel. Each hydrologic zone, namely inner bank, floodplain, transition, and upland slope, was examined. A list of species was compiled for the various stratums, from the herbaceous layer to the tree canopy species (**Appendix E**). The hydrologic zone in which a particular species is most likely to survive and become established is also provided in **Appendix E**.

The construction of the new stream might extend over several planting seasons. Survival rates for certain species would be low if planted at the wrong time of year. To provide a permanent cover, a mix of native species would be planted during the proper planting season. Trees would be planted during the dormant season, *i.e.*, either in the fall after leaf drop or in early spring before bud break. Should the time of year not be suitable for permanent vegetation, a temporary cover of fast-growing annuals, such as browntop millet or oats, would be established. The specific species and methods of planting would be carefully coordinated. Guidelines for the time to plant a particular species are provided in **Appendix E**.

Herbaceous material might be installed by using seeds, plugs, and/or containerized individuals. Woody plants such as shrubs, small trees, and mast producing trees might be installed using bare-root, balled and burlapped (B&B), and /or containerized individuals. The choice of the type of material to be installed would depend on the time of year, availability from nurseries, and site conditions at planting time.

7.7.2 Vegetation Establishment

Irrigation might be necessary, during periods of low rainfall, to enhance the growth and establishment of good vegetative cover. It is critical to get this initial start in order to allow for robust growth in succeeding years and to increase the structural stability of the proposed channel. Soil moisture is particularly important during the establishment of seeded material as some species might

have a limited window of germination. Woody plant species would require soil moisture to develop a good root system to support the shoots and foliage that would enable these plants to survive into the next growing season.

Should irrigation be required then supplementary watering would be supplied. To avoid utilizing water from Home Branch, treated water from the settling pond would be utilized.

A temporary earthen dam with four 18-inch pipes would be placed at the start of the proposed stream channel (**Figures 7-2, 7-10,** and **7-11**) to restrict the amount of water flow to less than the bankful volume until vegetation has become well established. The remainder of water would continue to discharge through the diversion canal to Four Hole Swamp. Upon the establishment of sustainable vegetation, the earthen dam would be removed and water from the diversion canal would be diverted to the proposed channel.

Depredation of the newly planted vegetation by deer might be of concern. This should be minimal due to the surrounding land use as well as the natural habitat. The active quarry site that is surrounded by a deep canal to the east and an operating cement plant to the west should minimize deer impact. Four Hole Swamp with standing water and limited food supply for deer would also serve as a deterrent. The most likely access for deer into the new stream would be from the north. Should deer interfere with the establishment of a good vegetative cover, Holcim would have to determine appropriate deterrent methods.

7.7.3 Bioengineering and Structures

Should the stream channel require stabilization in order to maintain the Rosgen C-type stream configurations, only natural materials would be used. Although vegetative erosion control measures would be utilized wherever possible, bioengineering would be used when flow velocities, soils, and bank stability preclude stabilization by vegetation alone.

It is recommended that materials native to the region should be used whenever possible. Woody debris plays a significant role in low-sloping Coastal Plain streams with sand beds. Thus log structures would be more appropriate than rock structures. In addition, log structures such as log vanes, crib-walls, and root wads enhance habitat by adding woody debris to the stream.

If structures are required, they would be designed with the following goals in mind:

- Maintain a stable width-to-depth ratio
- Decrease near-bank velocity
- Reduce erosion potential and sediment deposition
- Improve fish habitat
- Be visibly compatible with natural channels of the region

7.8 Storm Water Management

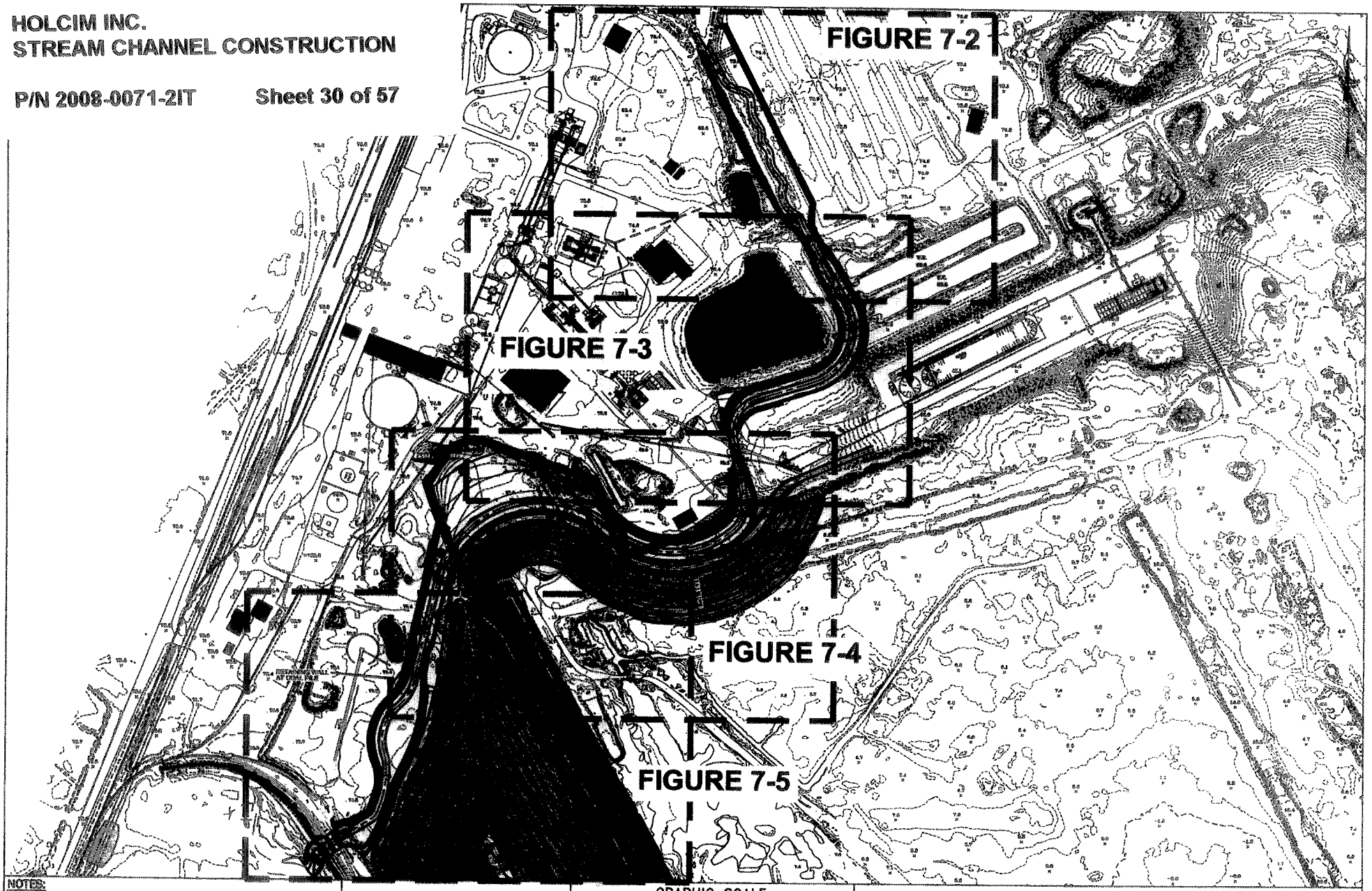
Storm water from the cement manufacturing facility and associated quarry is currently treated in NPDES-permitted settling basin prior to discharging into Home Branch. Structures and controls described in this section would be installed to maintain this condition.

An earthen berm would extend the entire length of the proposed channel on both sides (**Figures 7-6** through **7-9**). The berm would prevent untreated storm water runoff from the plant facility entering the channel. Storm water runoff from manufacturing areas west of the proposed channel would be directed to one of the two NPDES-permitted settling ponds (**Figure 7-2**) or the Geocycle storm water canal (described in this section; **Figure 7-5**). Discharge from the ponds would flow via a drop inlet into the proposed Home Branch channel (relocated NPDES Outfall; **Figure 7-2**).

Storm water runoff from manufacturing areas east of the proposed channel would be directed to the sump in the inactive area of the quarry. Water from this sump would then be pumped to one of the surface settling ponds for treatment prior to discharging into the proposed channel.

Storm water from the Geocycle hazardous waste fuel blending operation near the southern end of the proposed channel is contained and inspected prior to discharge from the containment area around the facility. Storm water discharged from the containment area flows to a manmade canal that extends along Four Hole Swamp parallel to the rail sidings southwest of the quarry (**Figure 7-5**). When necessary, storm water from this canal is pumped into the quarry after being tested for possible chemical contaminants. The proposed channel would cross this canal. A submerged culvert

would be installed beneath the proposed channel (**Figures 7-9** and **7-16**) to allow for gravity flow and equalization within the canal on both sides of the proposed channel.



NOTES:

1.) BASE TOPOGRAPHY PROVIDED BY:
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PEACHTREE CITY, GEORGIA
DATE OF PHOTOGRAPHY: JUNE 16, 2005

AND CKD SPOILS AREA BY:
WOLVERTON & ASSOCIATES
DULUTH, GEORGIA
DATE OF PHOTOGRAPHY: MARCH 24, 2007

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PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-1
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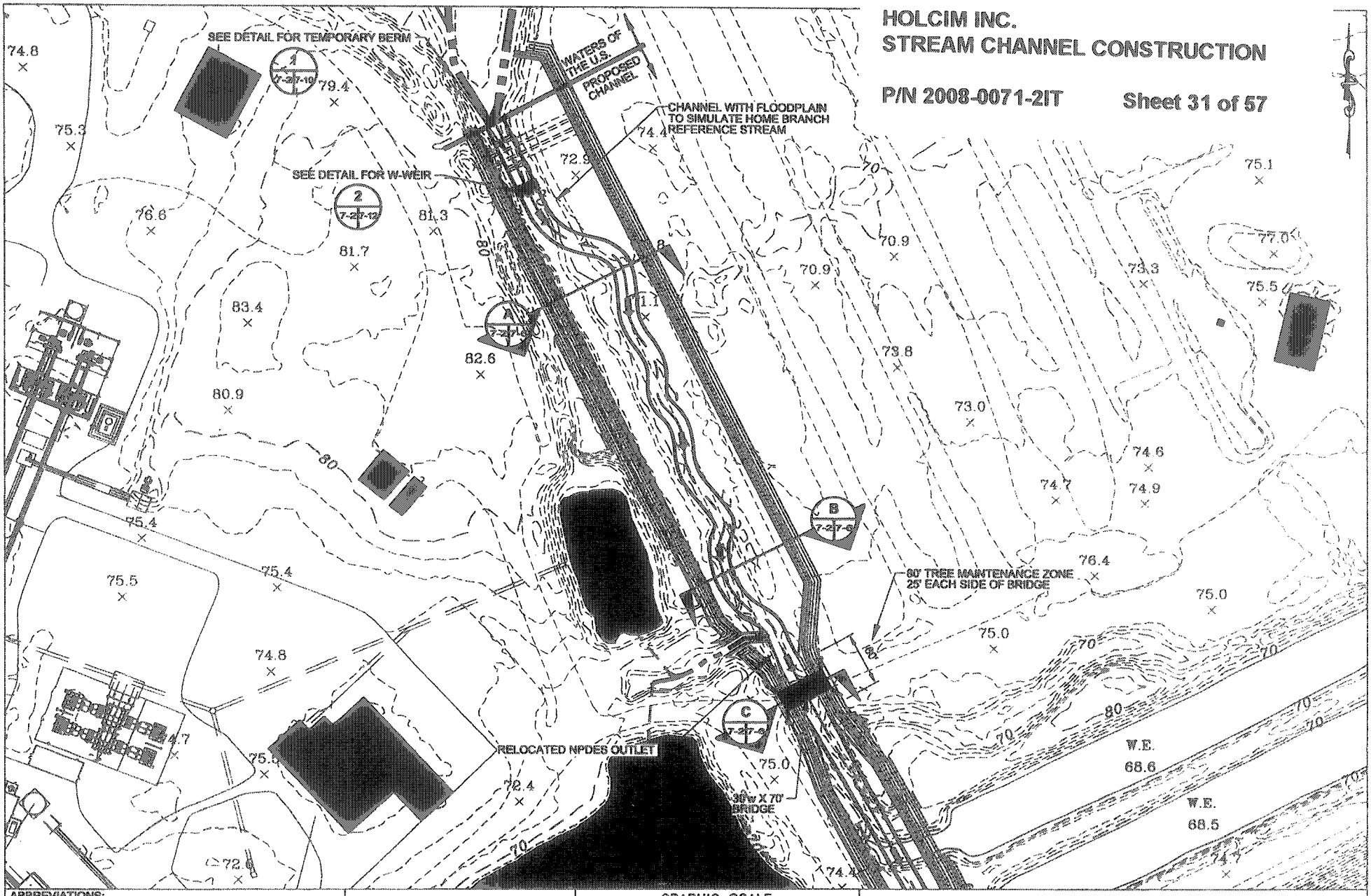
FIGURE 7-1
PLAN VIEW OF PROPOSED STREAM
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT **Sheet 31 of 57**



ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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SCALE: 1" = 200'

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FIGURE 7-2
PROPOSED STREAM DESIGN - SEGMENT A
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION
P/N 2008-0071-21T
Sheet 32 of 57

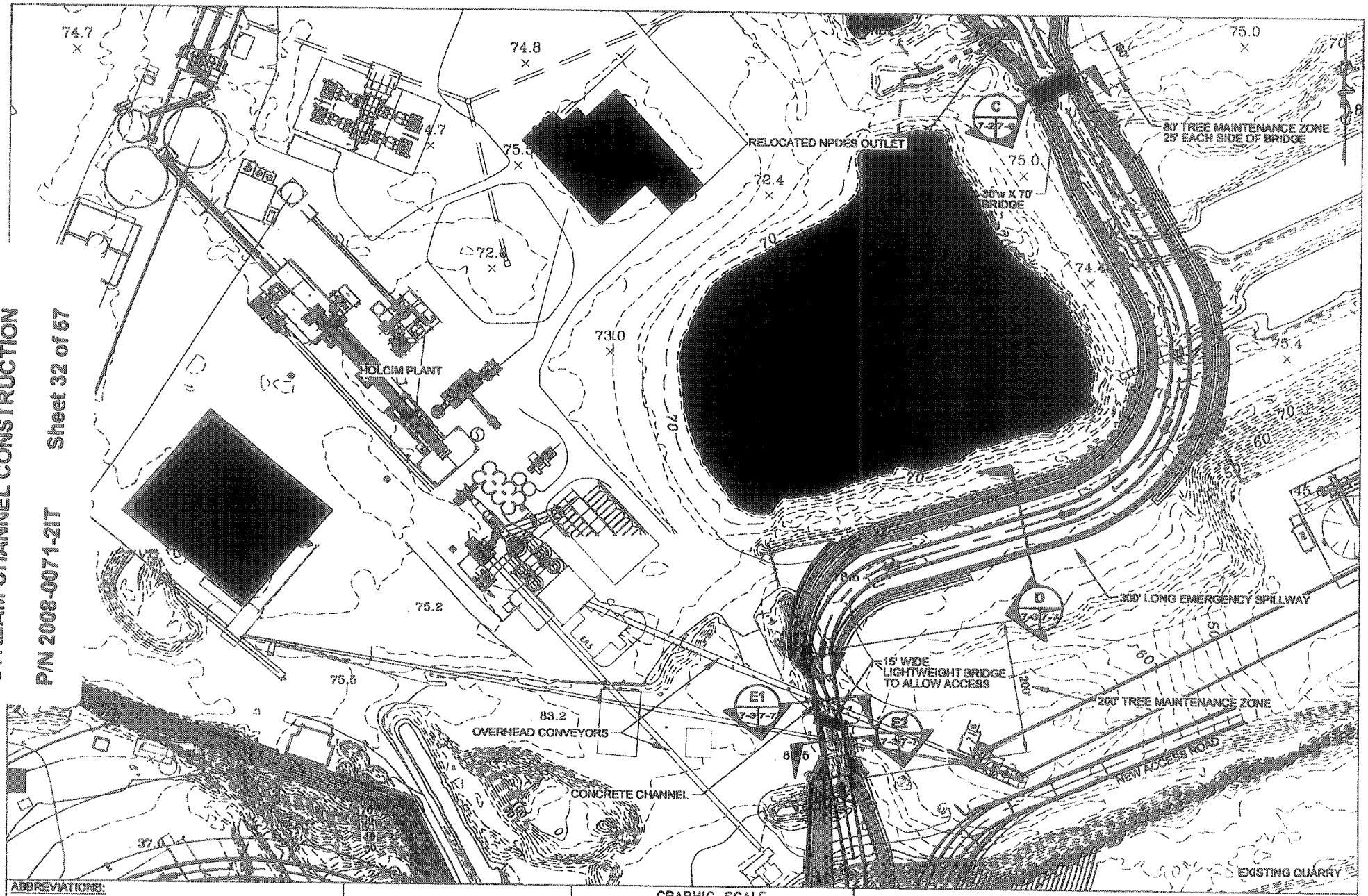

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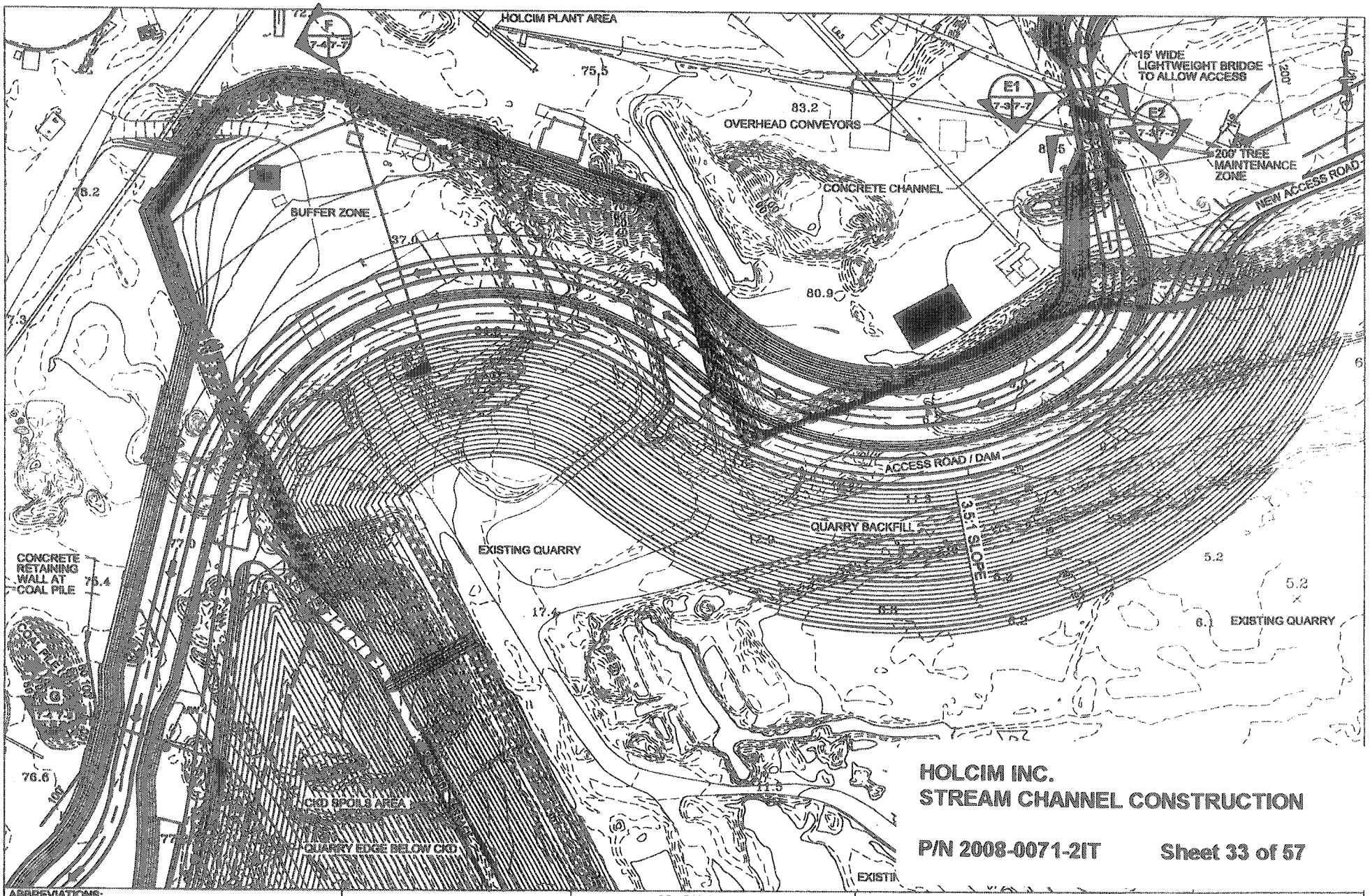
FIGURE 7-3
PROPOSED STREAM DESIGN - SEGMENT B
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT **Sheet 33 of 57**

ABBREVIATIONS:

EL.	= ELEVATION
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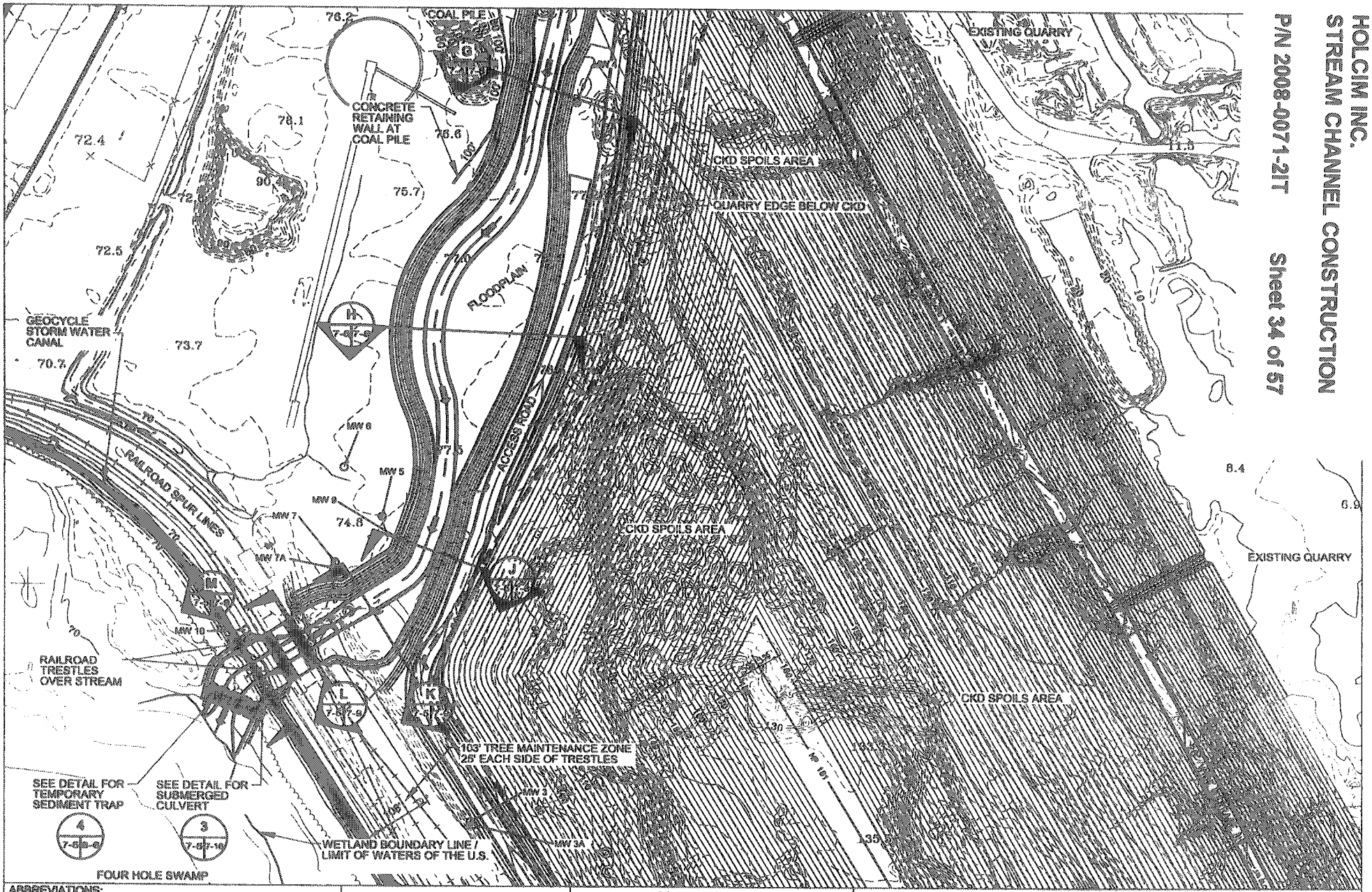
FIGURE 7-4
PROPOSED STREAM DESIGN - SEGMENT C
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION
P/N 2008-0071-21T Sheet 34 of 57



ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
100 0 100 200
SCALE: 1" = 200'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-5
ORIGINAL DATE: 11/21/2007
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REV: A

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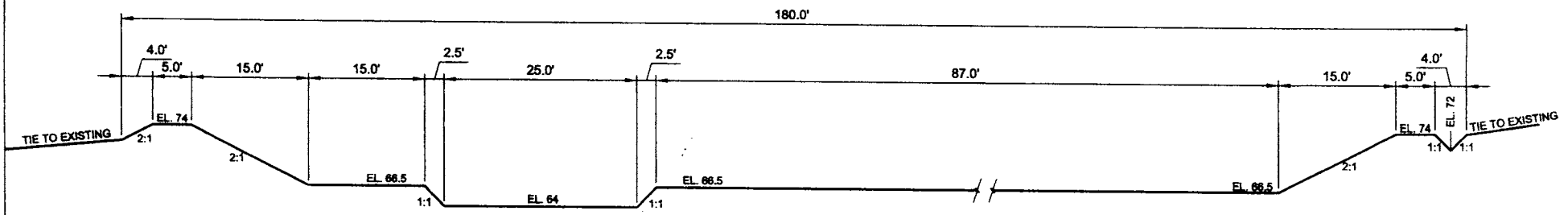
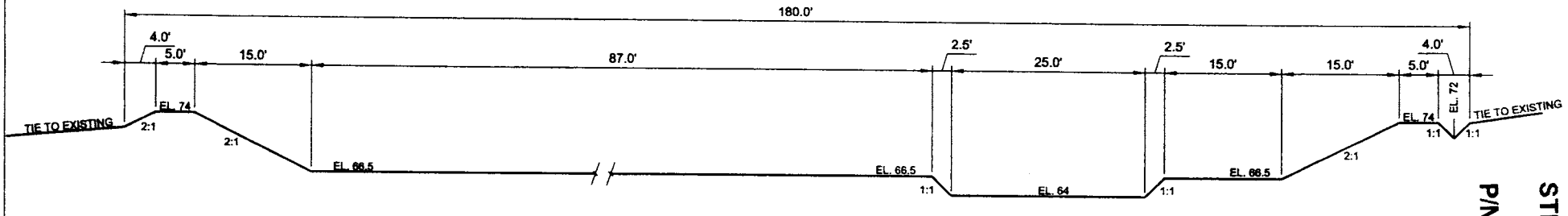
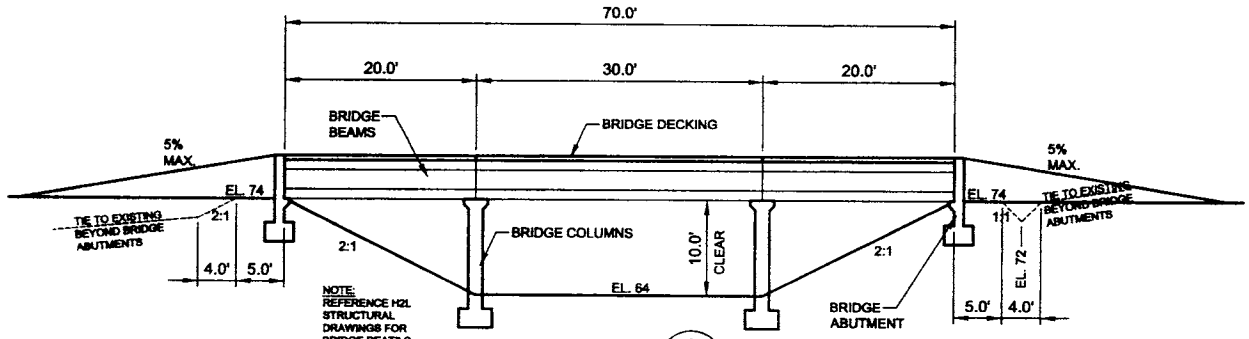
FIGURE 7-5
PROPOSED STREAM DESIGN - SEGMENT D
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



SECTION A (7-2/7-6)
SCALE: 1" = 20'



SECTION B (7-2/7-6)
SCALE: 1" = 20'



SECTION C (7-2/7-6)
SCALE: 1" = 20'

NOTES:
ALL SECTIONS ARE CUT LOOKING DOWNSTREAM. (FROM NORTH TO SOUTH)

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

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PHONE 864-421-9999
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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-6
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
REV: A

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FIGURE 7-6
PROPOSED CROSS-SECTIONS A THRO
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

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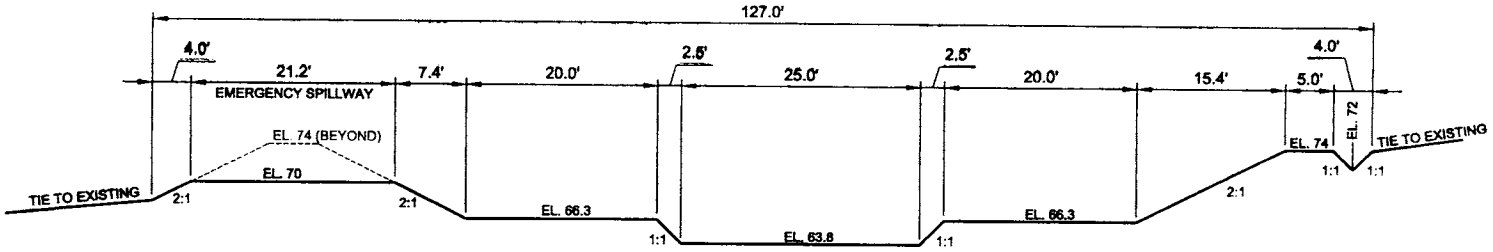
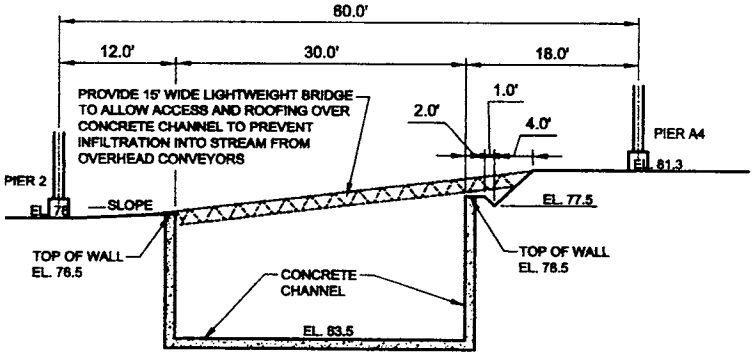
HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT

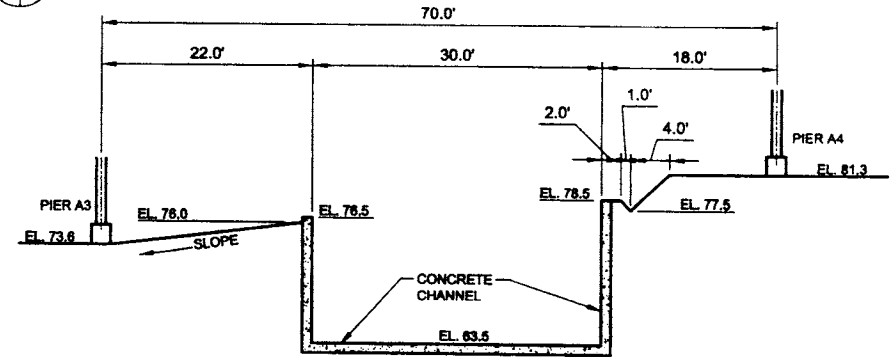
Sheet 36 of 57



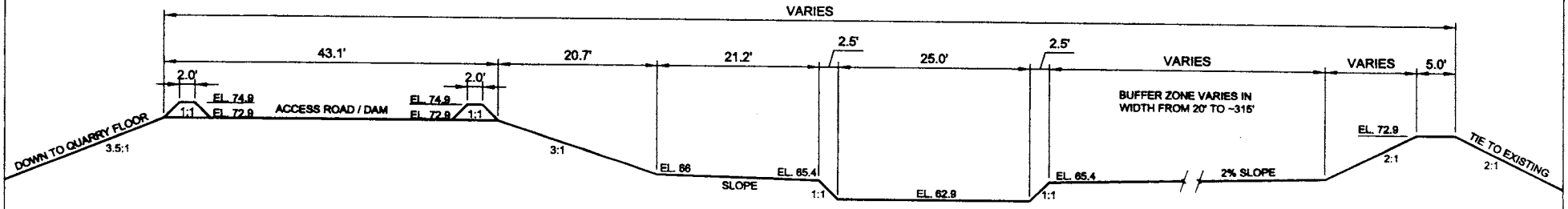
SECTION D
SCALE: 1" = 20'
7-3 | 7-7



SECTION E1
SCALE: 1" = 20'
7-3 | 7-7



SECTION E2
SCALE: 1" = 20'
7-3 | 7-7



SECTION F
SCALE: 1" = 20'
7-4 | 7-7

NOTES:
ALL SECTIONS ARE CUT LOOKING DOWNSTREAM. (FROM NORTH TO SOUTH)

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-7
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
REV: A

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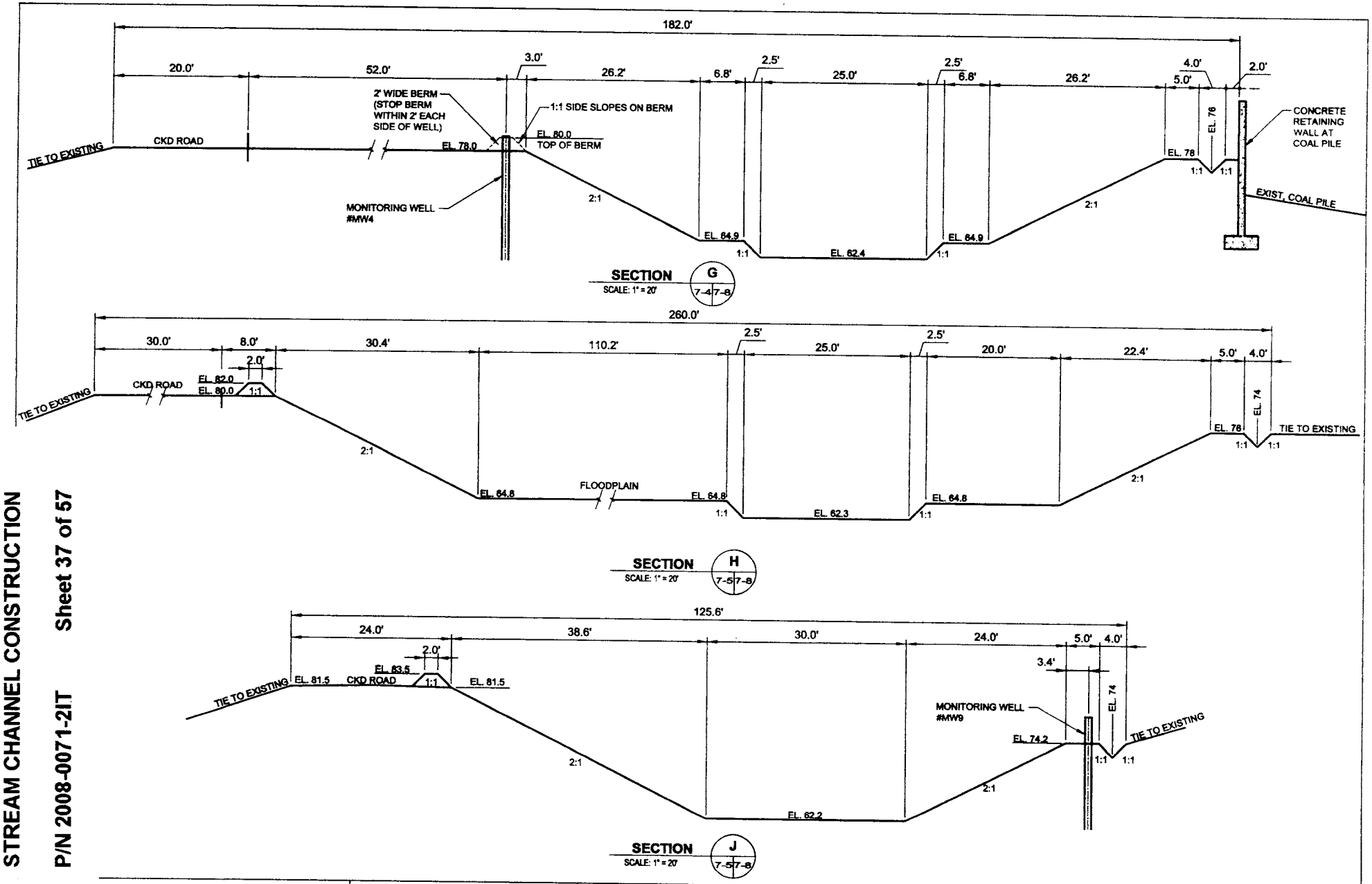
FIGURE 7-7
PROPOSED CROSS-SECTIONS D THROUGH F
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-21T

Sheet 37 of 57



ALL SECTIONS ARE CUT LOOKING DOWNSTREAM. (FROM NORTH TO SOUTH)

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
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MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-8
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
REV: A
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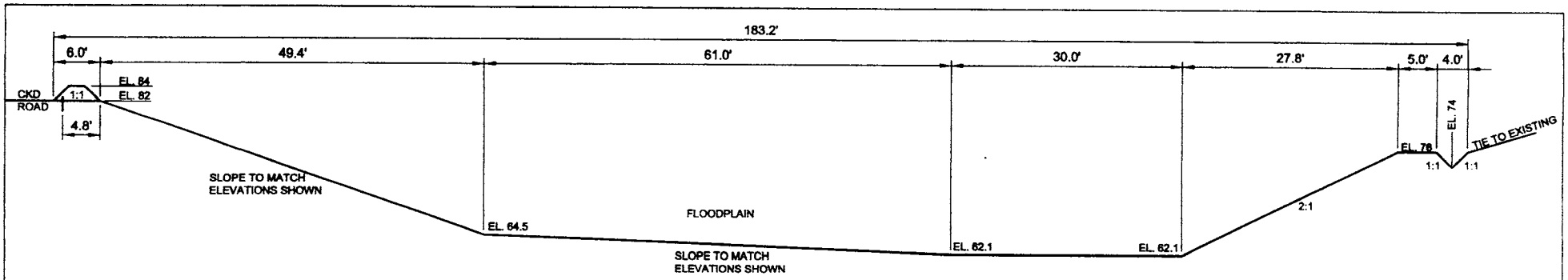
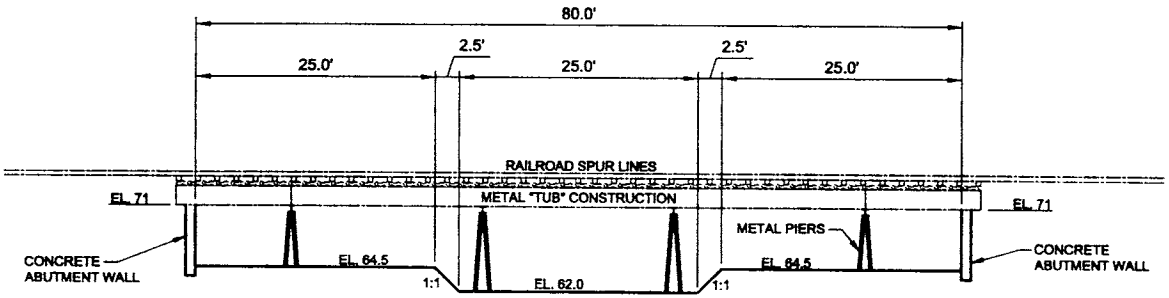
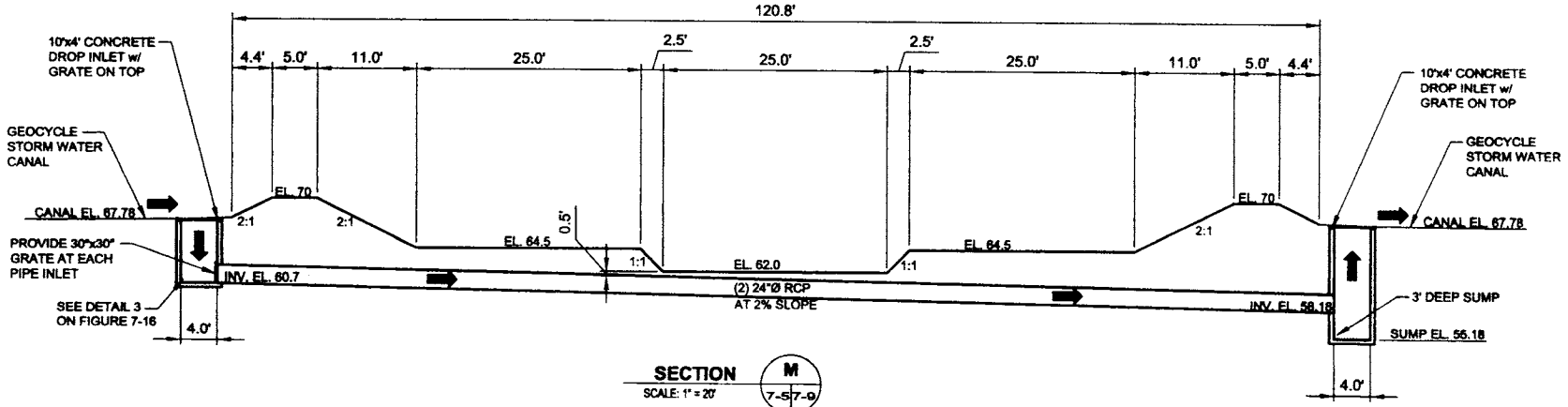
FIGURE 7-8
PROPOSED CROSS-SECTIONS G THROUGH J
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



SECTION K (7-5/7-9)
SCALE: 1" = 20'



SECTION L (7-5/7-9)
SCALE: 1" = 20'



SECTION M (7-5/7-9)
SCALE: 1" = 20'

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION
P/N 2008-0071-2IT
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NOTES:
ALL SECTIONS ARE CUT LOOKING DOWNSTREAM. (FROM NORTH TO SOUTH)

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-9
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
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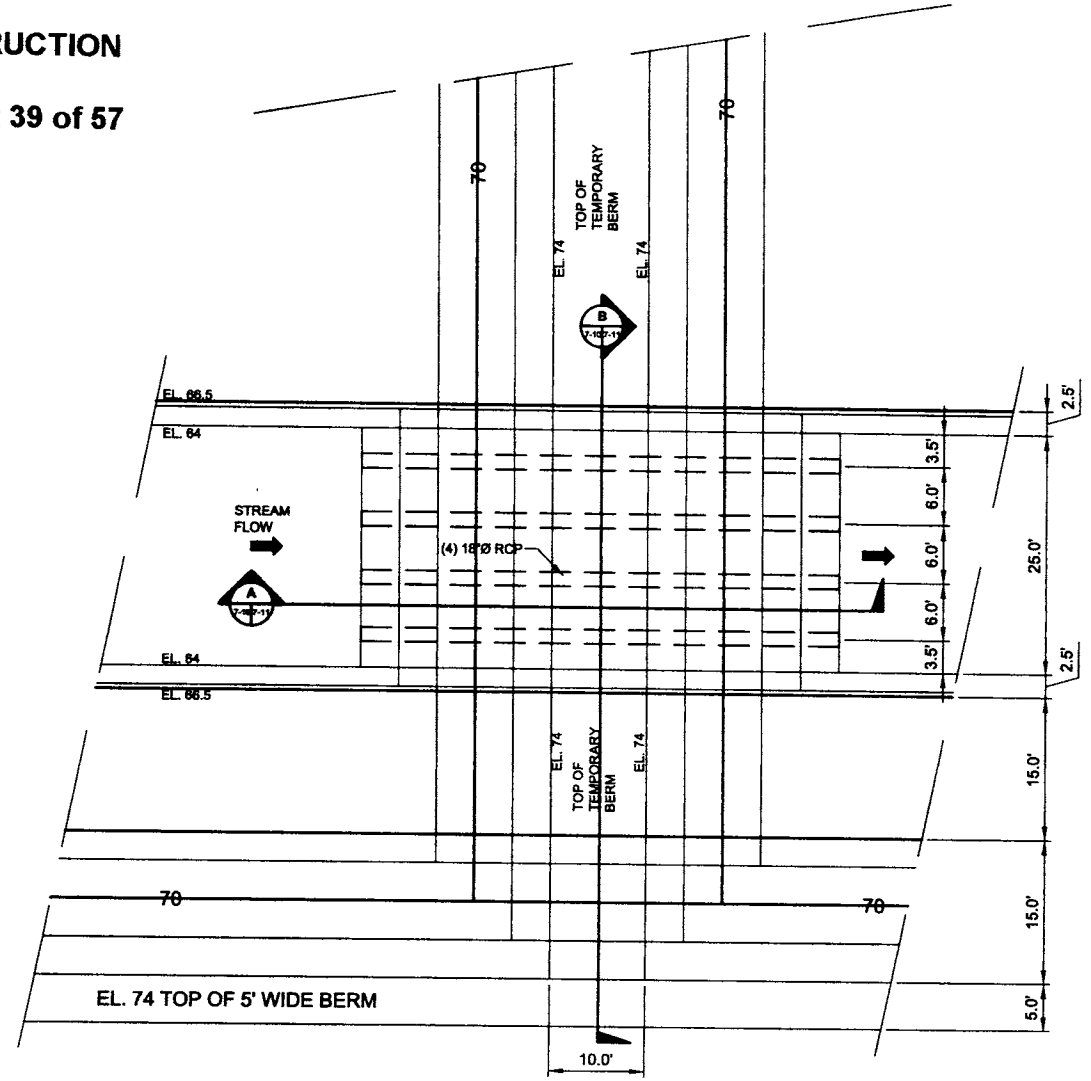
FIGURE 7-9
PROPOSED CROSS-SECTIONS K THROUGH M
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



DETAIL 1 (7-2/7-10)
SCALE: 1" = 20'

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-10
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
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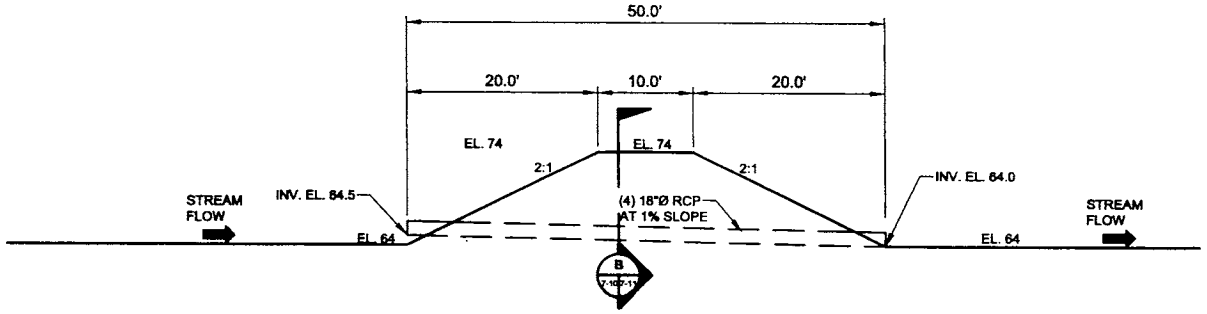
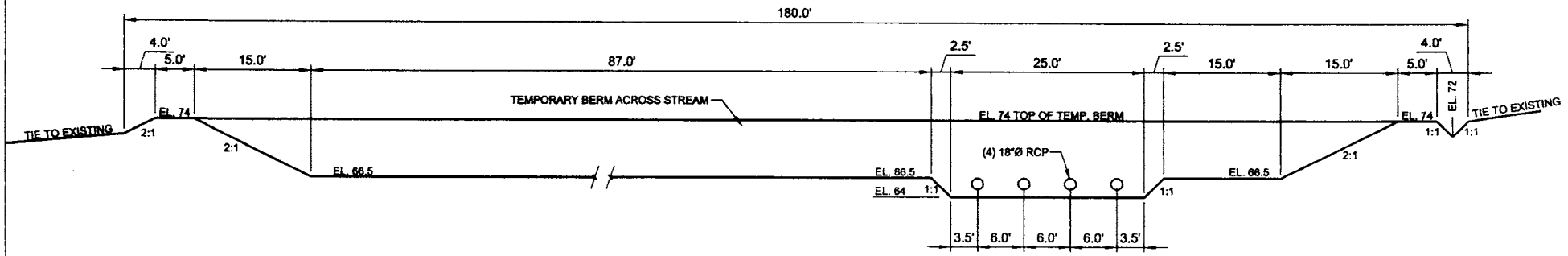
FIGURE 7-10
TEMPORARY BERM DETAIL
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



SECTION A
SCALE: 1" = 20'



SECTION B
SCALE: 1" = 20'

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-11
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
REV: A

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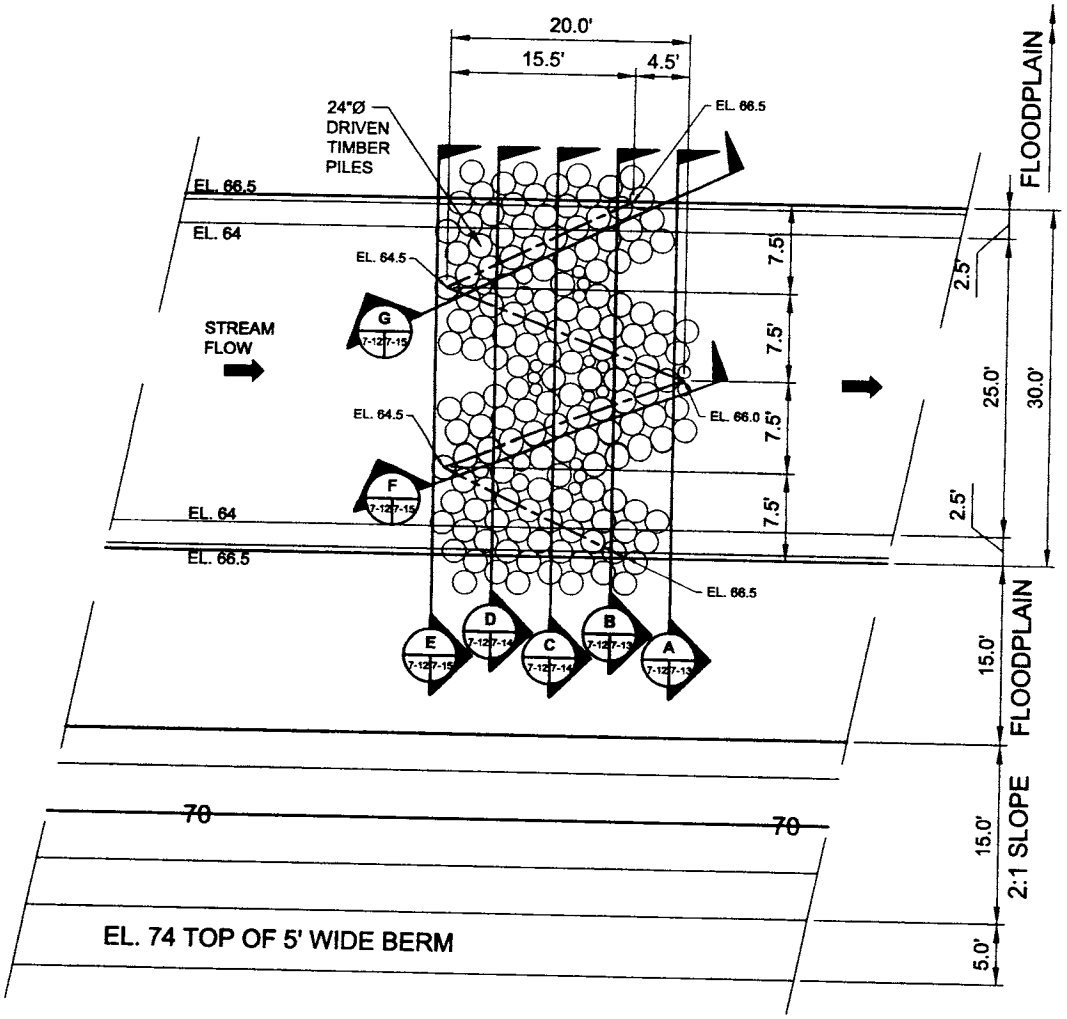
FIGURE 7-11
TEMPORARY BERM SECTIONS
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-21T

Sheet 41 of 57



DETAIL 2 (7-2/7-12)
SCALE: 1" = 16'

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
8 0 8 16
SCALE: 1" = 16'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-12
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
REV: A
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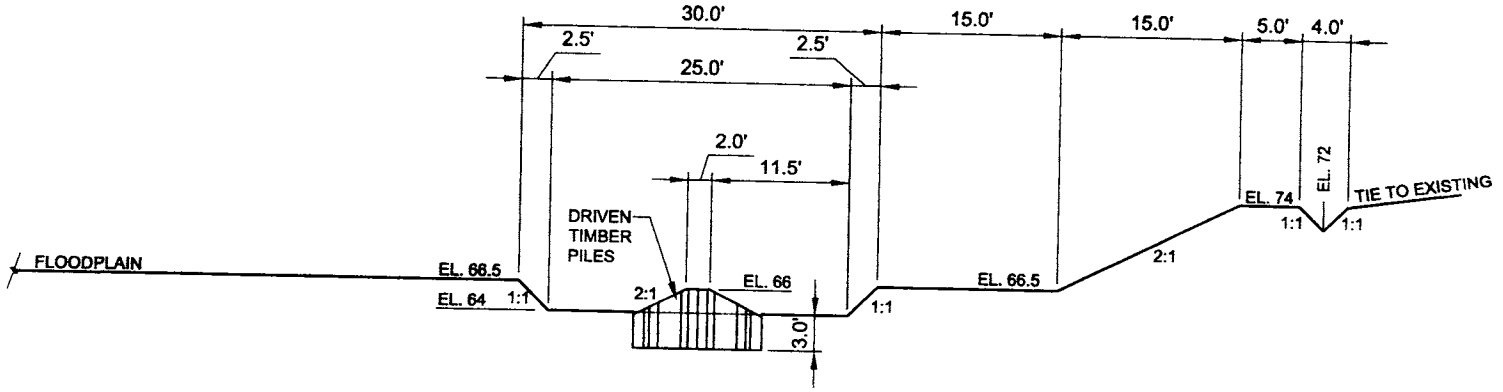
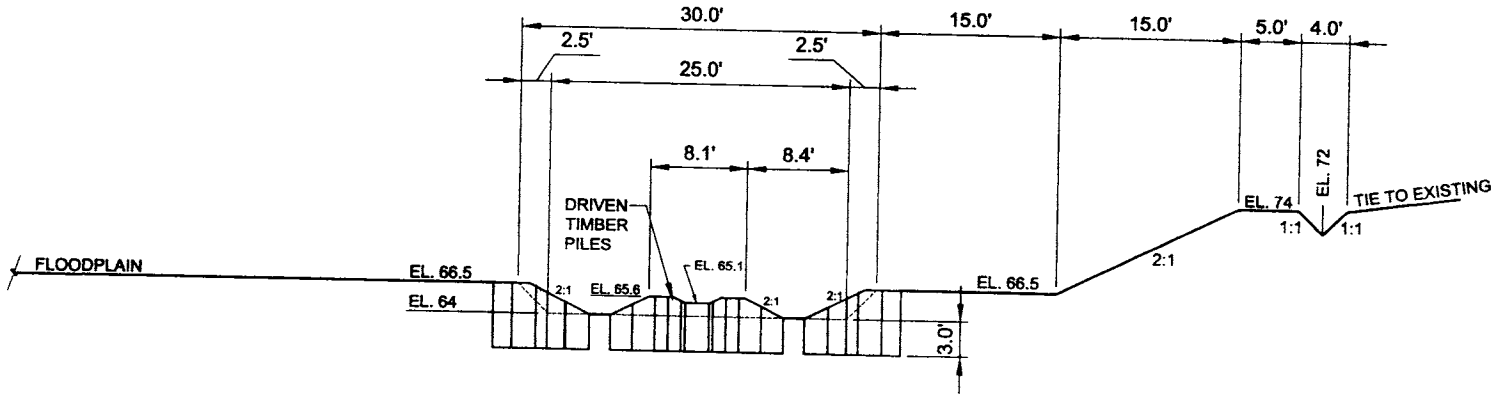
FIGURE 7-12
TEMPORARY W-WEIR DETAIL
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



SECTION A
SCALE: 1" = 16'
7-12/7-13



SECTION B
SCALE: 1" = 16'
7-12/7-13

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
8 0 8 16
SCALE: 1" = 16'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-13
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
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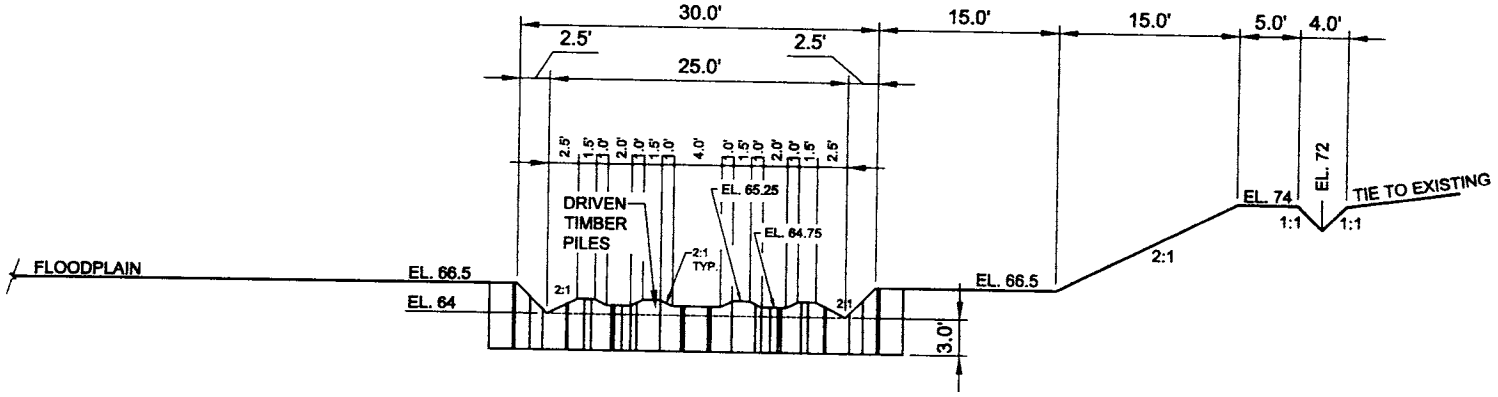
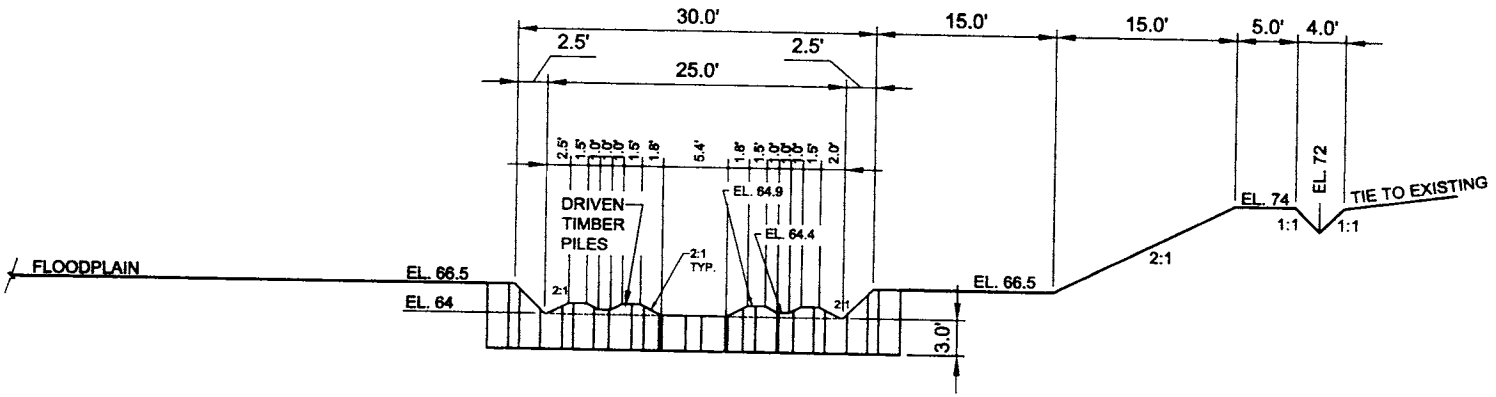
FIGURE 7-13
TEMPORARY W-WEIR SECTIONS A THROUGH B
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



SECTION C
SCALE: 1" = 16'
7-12 7-14



SECTION D
SCALE: 1" = 16'
7-12 7-14

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

GRAPHIC SCALE
8 0 8 16
SCALE: 1" = 16'

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-14
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
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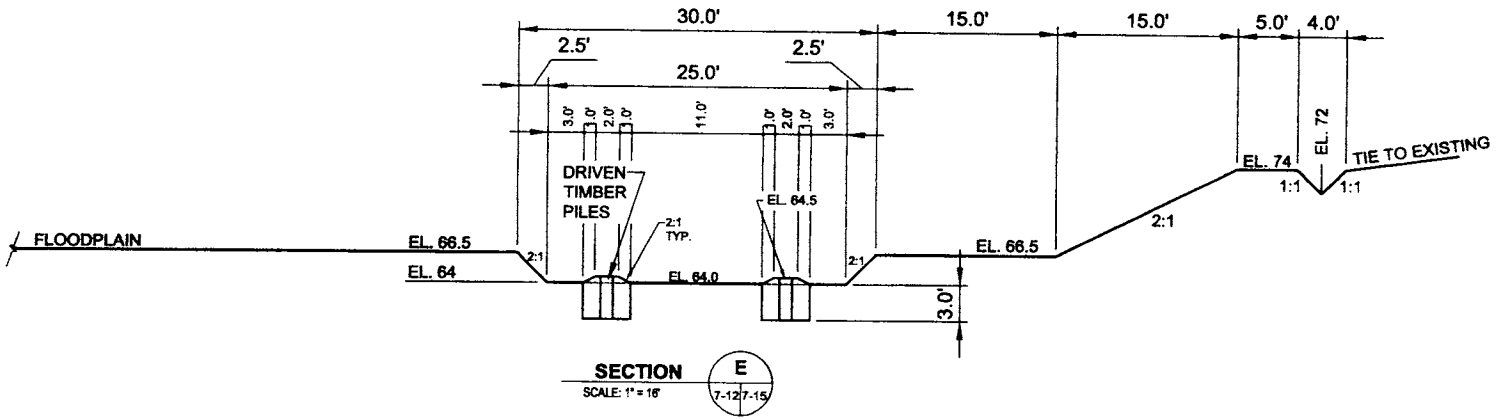
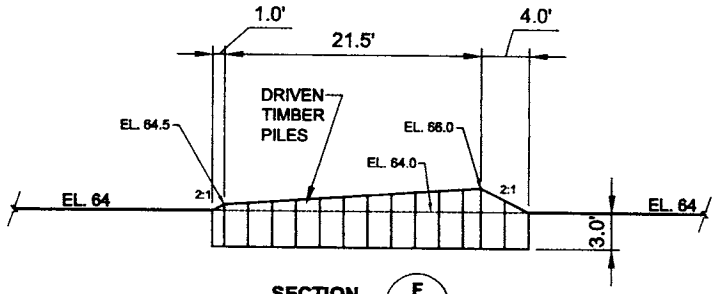
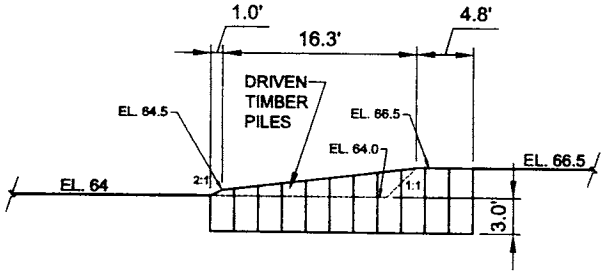
FIGURE 7-14
TEMPORARY W-WEIR SECTIONS C THROUGH D
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



SECTION E (7-12/7-15)
SCALE: 1" = 16'



SECTION F (7-12/7-15)
SCALE: 1" = 16'



SECTION G (7-12/7-15)
SCALE: 1" = 16'

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT Sheet 44 of 57

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
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MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

synTerra

GRAPHIC SCALE
8 0 8 16
SCALE: 1" = 16'

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GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-15
ORIGINAL DATE: 11/21/2007
REVISED DATE: 11/21/2007
REV: A
12/06/2007 3:55 PM
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FIGURE 7-15
TEMPORARY W-WEIR SECTIONS E THROUGH G
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT

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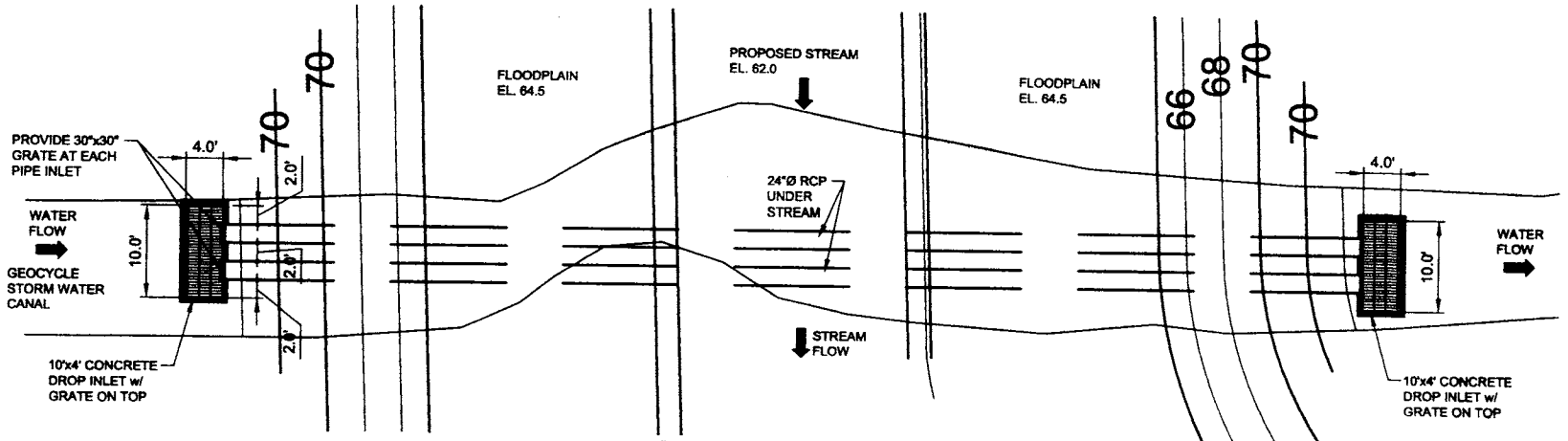
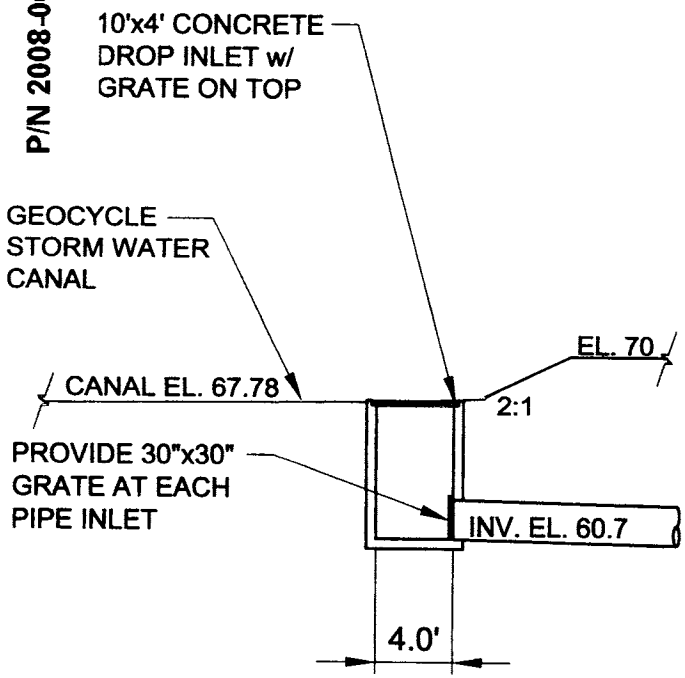
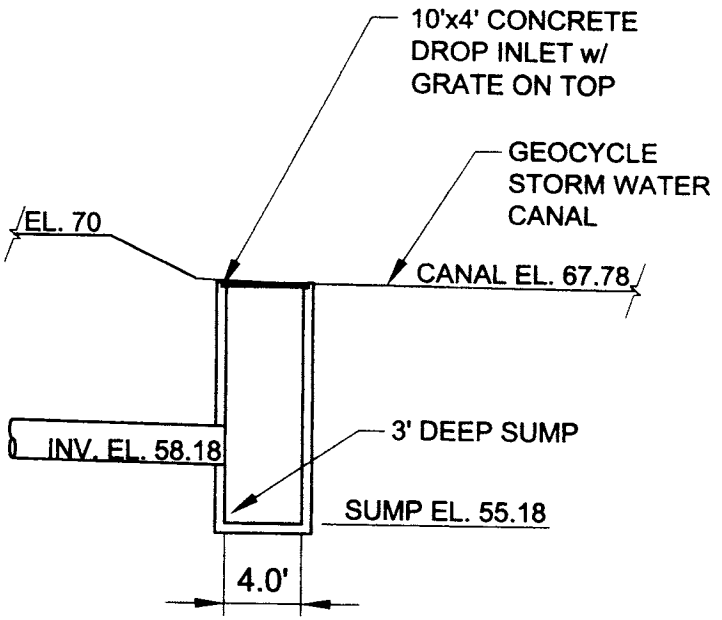


SEE FIGURE 7-9 SECTION M

DETAIL 3 (7-5/7-16)
SCALE: 1" = 20'



UPSTREAM DROP INLET ELEVATION
SCALE: 1" = 10'



DOWNSTREAM DROP INLET ELEVATION
SCALE: 1" = 10'

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

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DRAWN BY: J. COLEMAN
PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 7-16
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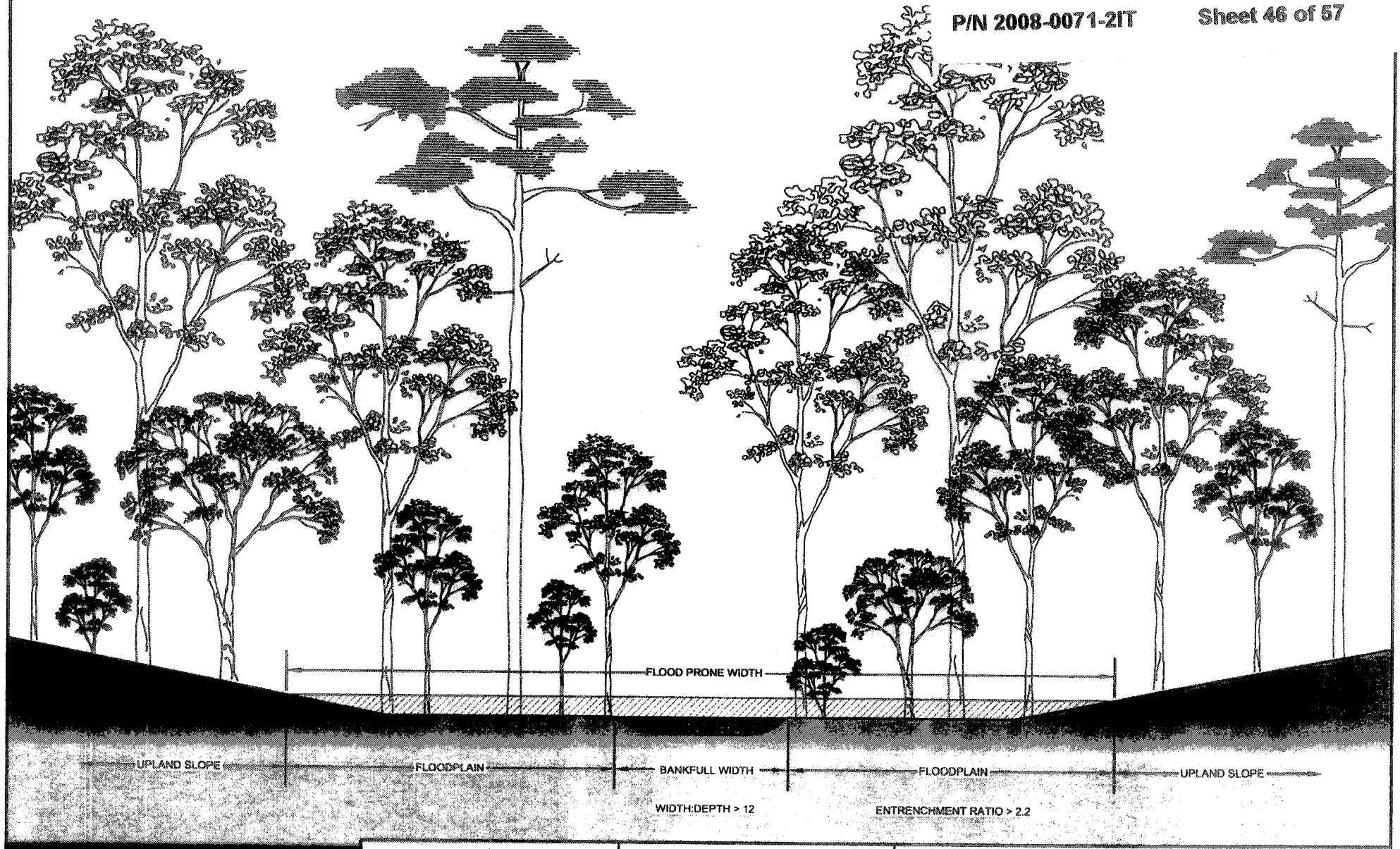
FIGURE 7-16
SUBMERGED CULVERT DETAILS
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



NOT TO SCALE

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DRAWN BY: J. CHASTAIN DATE: 10/26/2007
PROJECT MANAGER: MARK TAYLOR
LAYOUT: 7-17 X-SECT

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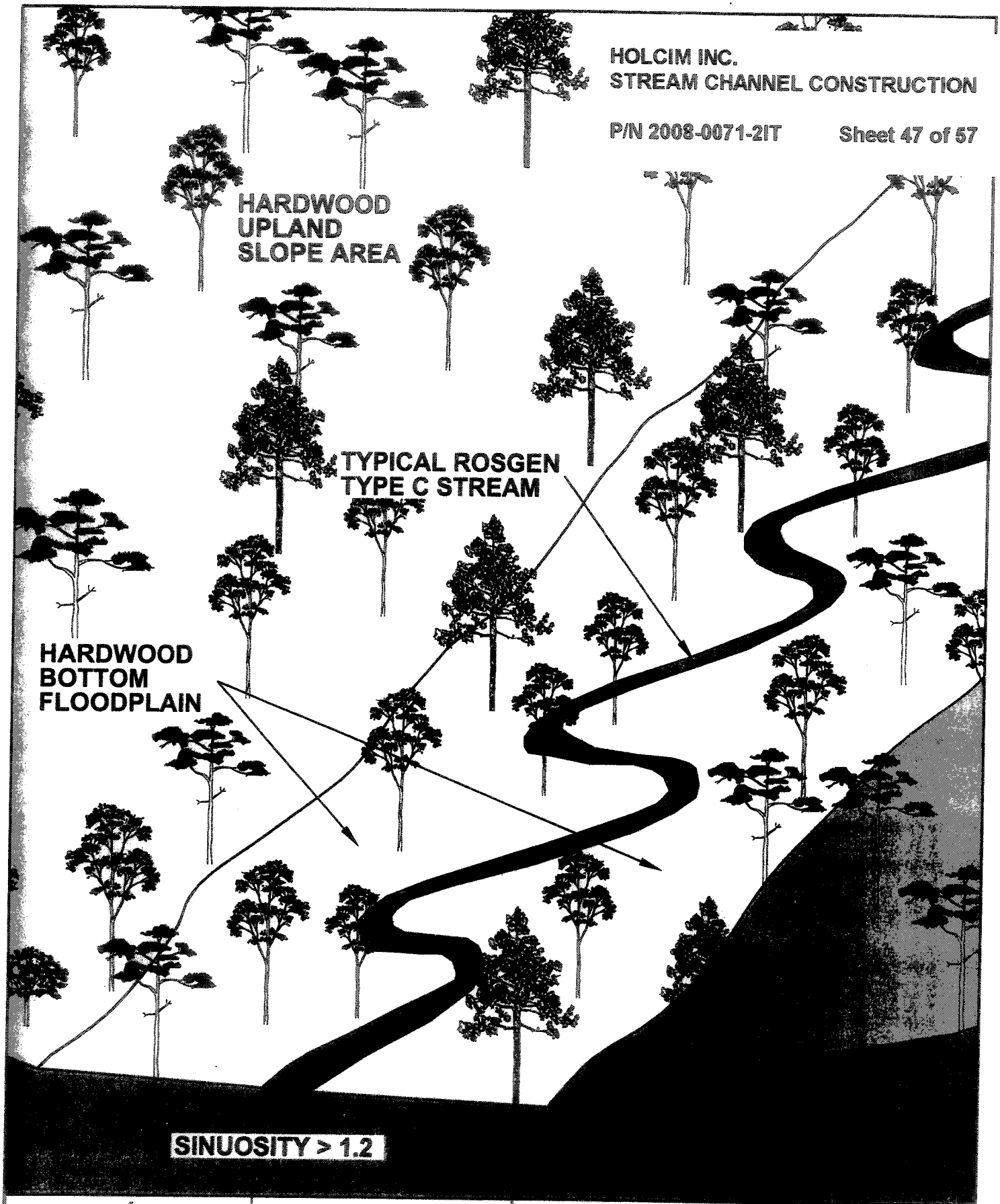
FIGURE 7-17
TYPICAL CROSS-SECTION
OF ROSGEN TYPE C STREAM
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



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DRAWN BY: JOHN CHASTAIN DATE: 03/30/2006
PROJECT MANAGER: M. TAYLOR
LAYOUT: 7-18 PLAN

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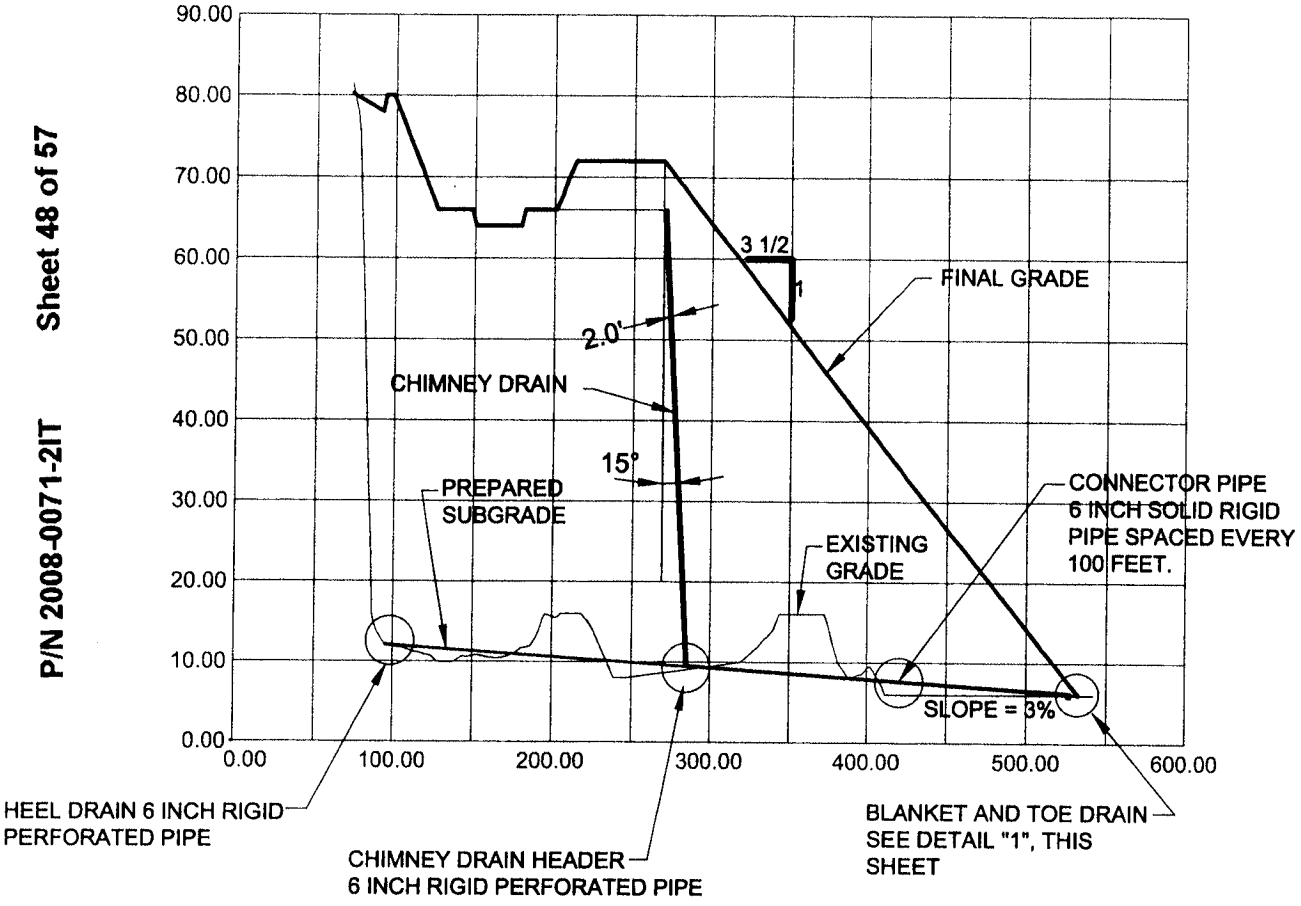
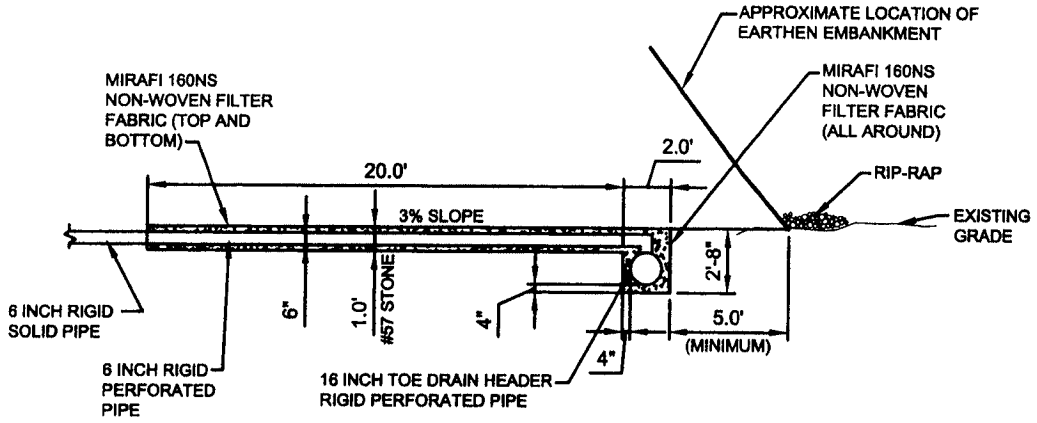
FIGURE 7-18
TYPICAL PLAN-VIEW OF ROSGEN TYPE C STREAM
HOME BRANCH RELOCAITON
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



TYPICAL CROSS SECTION

NOT TO SCALE



NOTE: FILTER FABRIC SHOULD FULLY SEPARATE STONE FROM SOIL.
SEE MANUFACTURERS RECOMMENDATIONS FOR OVERLAP LENGTHS.

DETAIL "1"
BLANKET AND TOE DRAIN

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PROJECT MANAGER: M. TAYLOR
LAYOUT: FIGURE 7-20A

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FIGURE 7-20A
EMBANKMENT DRAINAGE SYSTEM
HOME BRANCH EMBANKMENT
HOLCIM (US) INC.
HOLLYHILL, SOUTH CAROLINA

DRAINAGE SYSTEM DETAILS

1. HEEL DRAIN
   - 6 INCH RIGID PERFORATED PIPE
   - WRAPPED IN MIRAFI 160NS NON-WOVEN FILTER FABRIC
   - TIES INTO 16 INCH PIPE IN TOE DRAIN

2. CHIMNEY DRAIN
   - 6 INCH RIGID PERFORATED PIPE AT BASE PARALLEL TO SLOPE
   - BEDDED IN 2 FEET THICK #57 STONE
   - WRAPPED IN MIRAFI 160NS NON-WOVEN FILTER FABRIC
   - 15° SLOPE FROM VERTICAL AXIS

3. CONNECTOR PIPE
   - RUNS FROM 6 INCH PIPE IN BASE OF CHIMNEY DRAIN AND TIES INTO 6 INCH RIGID PERFORATED PIPE IN BLANKET DRAIN
   - 6 INCH RIGID SOLID PIPE AT BASE
   - WRAPPED IN MIRAFI 160NS NON-WOVEN FILTER FABRIC
   - SPACED EVERY 100 FEET
   - SLOPED AT 3 PERCENT

4. BLANKET DRAIN
   - 20 FEET LONG
   - 1 FOOT THICK #57 STONE WITH 6 INCH RIGID PERFORATED PIPE THAT TIES INTO 16 INCH TOE DRAIN PIPE
   - WRAPPED IN MIRAFI 160NS NON-WOVEN FILTER FABRIC
   - 2 FOOT EXTENSION OUTSIDE OF TOE COVERED WITH RIP RAP
   - CONNECTOR PIPES RUN THROUGH BLANKET BRAIN
   - SLOPED AT 3 PERCENT

5. TOE DRAIN
   - PLACED IN 2 FOOT EXTENSION OF BLANKET DRAIN
   - 16 INCH RIGID PERFORATED PIPE
   - BEDDED IN 12 INCH TOP COVER, 4 INCH SIDE COVERS, AND 4 INCH BOTTOM COVER OF #57 STONE
   - WRAPPED IN MIRAFI 160NS NON-WOVEN FILTER FABRIC
   - OUTLET PIPE TO BE 16 INCH SOLID RIGID PIPE WITH RIP-RAP AT THE END
   - OUTLET PIPE TO BE LOCATED AT LOWEST POINT OF TOE

6. SYNTHETIC LINER
   - COVERS CHANNEL BED WHERE THE CHANNEL CROSSES THE QUARRY WALL
   - CHANNEL BED IS LINED FOR A DISTANCE OF 25 FEET BEFORE AND AFTER THE INTERFACE
   - LINER EXTENDS 5 FEET BEYOND TOP OF CHANNEL SIDE SLOPE ON BOTH SIDES OF CHANNEL
   - LINER TO BE PLACED 5 FEET BELOW STREAM BOTTOM

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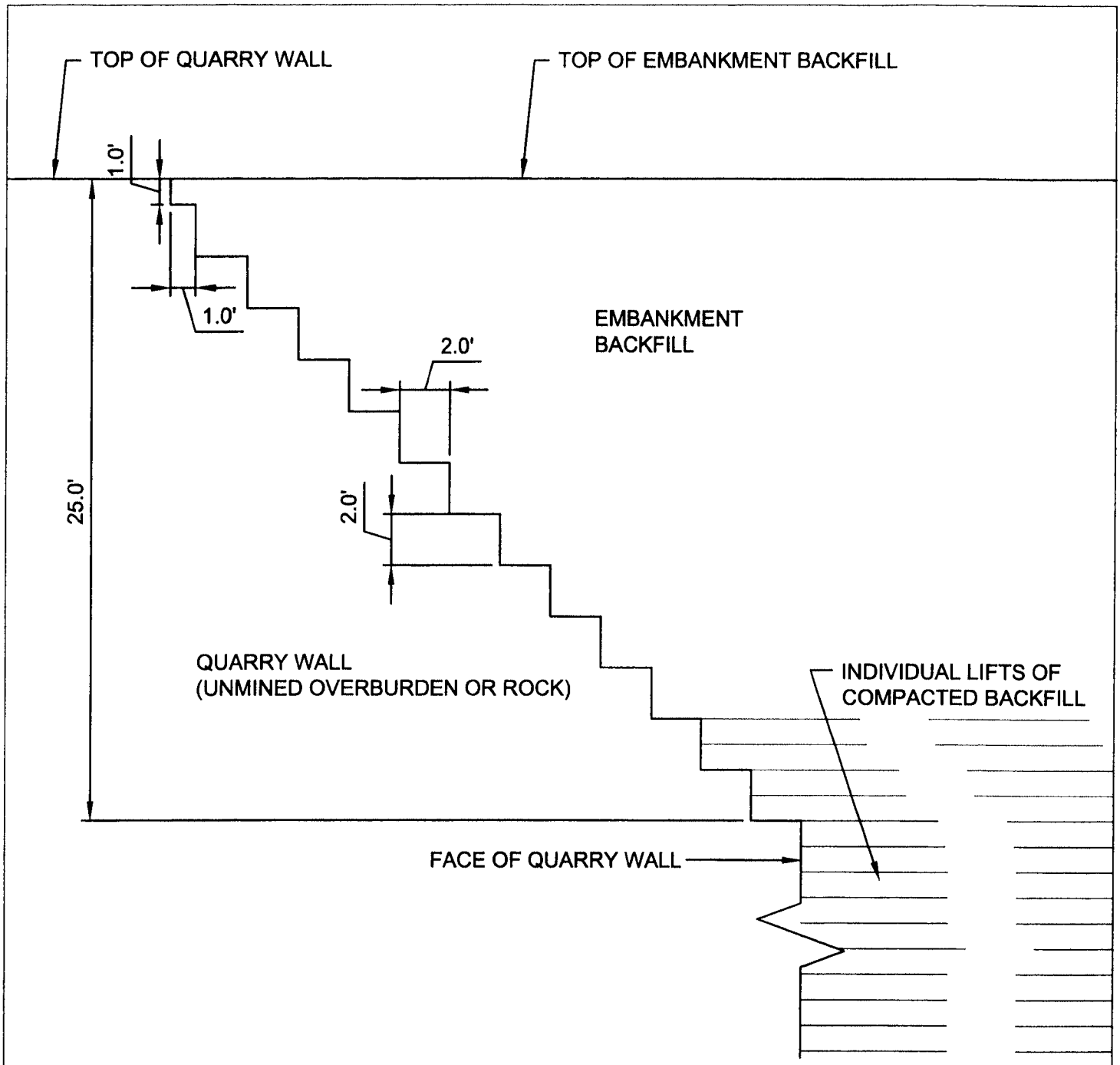
PROJECT MANAGER: M. TAYLOR
LAYOUT: FIGURE 7-20B

FIGURE 7-20B
DRAINAGE SYSTEM DETAILS
HOME BRANCH EMBANKMENT
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



QUARRY WALL BENCHING DETAIL
NOT TO SCALE

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-2IT **Sheet 50 of 57**

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PROJECT MANAGER: M. TAYLOR
LAYOUT: FIGURE 7-21

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FIGURE 7-21
QUARRY WALL BENCHING DETAIL
HOME BRANCH EMBANKMENT
HOLCIM (US) INC.
HOLLYHILL, SOUTH CAROLINA

8.3 Protection of Home Branch

To protect Home Branch, the existing earth barrier (Station 0+00; **Figure 8-2**) between Home Branch and the proposed stream would remain in place until the final stages of excavation. The proposed channel excavation from Station 0+00 to Station 10+00 (**Figure 8-2**) would take place after the remaining channel is complete and all disturbed areas are stabilized. This would protect Home Branch and also allow for uninterrupted flow of treated wastewater from the current permitted discharge point (at Station 9+50; **Figure 8-2**) to the existing discharge ditch and Home Branch diversion canal (**Figure 8-2**).

8.4 Protection of Four Hole Swamp

The second point of potential impact is at Four Hole Swamp. The existing earth barrier that separates the proposed channel from Four Hole swamp would not be excavated until stabilization of all construction areas from Station 10+00 through to this point (**Figures 8-2** through **8-5**). After stabilization of the channel from Station 10+00 to Station 57+50, the portion of the proposed channel from Station 57+50 (**Figure 8-5**) through the connection to Four Hole Swamp (approximately Station 58+50; **Figure 8-5**) would be excavated and stabilized. A temporary rip-rap sediment trap (**Figures 7-5** and **8-6**) would be constructed in the new channel.

8.5 Diversion of Treated Wastewater

Once the sediment trap is in place, the flow of treated wastewater from the permitted discharge point at Station 9+50 (**Figure 8-2**) would be diverted into the new stabilized channel. A temporary earthen berm (**Figures 7-10** and **7-11**) would be constructed at approximately Station 0+50 (**Figure 8-2**). This berm would prevent Home Branch from flowing into the new channel until the last portion of the channel is constructed and stabilized. Construction of the channel would then progresses from Station 10+00 back towards Station 0+50.

8.6 Diversion of Home Branch

When all new structures have been completed and the new channel, from the temporary berm at Station 0+50 to the connection to Four Hole Swamp, has been stabilized with vegetation, flow from Home Branch would be diverted into the new channel.

It is proposed that four 18-inch culverts would be placed through the temporary berm (**Figures 7-10** and **7-11**) to allow for a moderated flow from Home Branch into the new channel. These four 18-inch pipes would restrict the amount of water flow to less than the bankful volume until vegetation within the floodplains has become well established.

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

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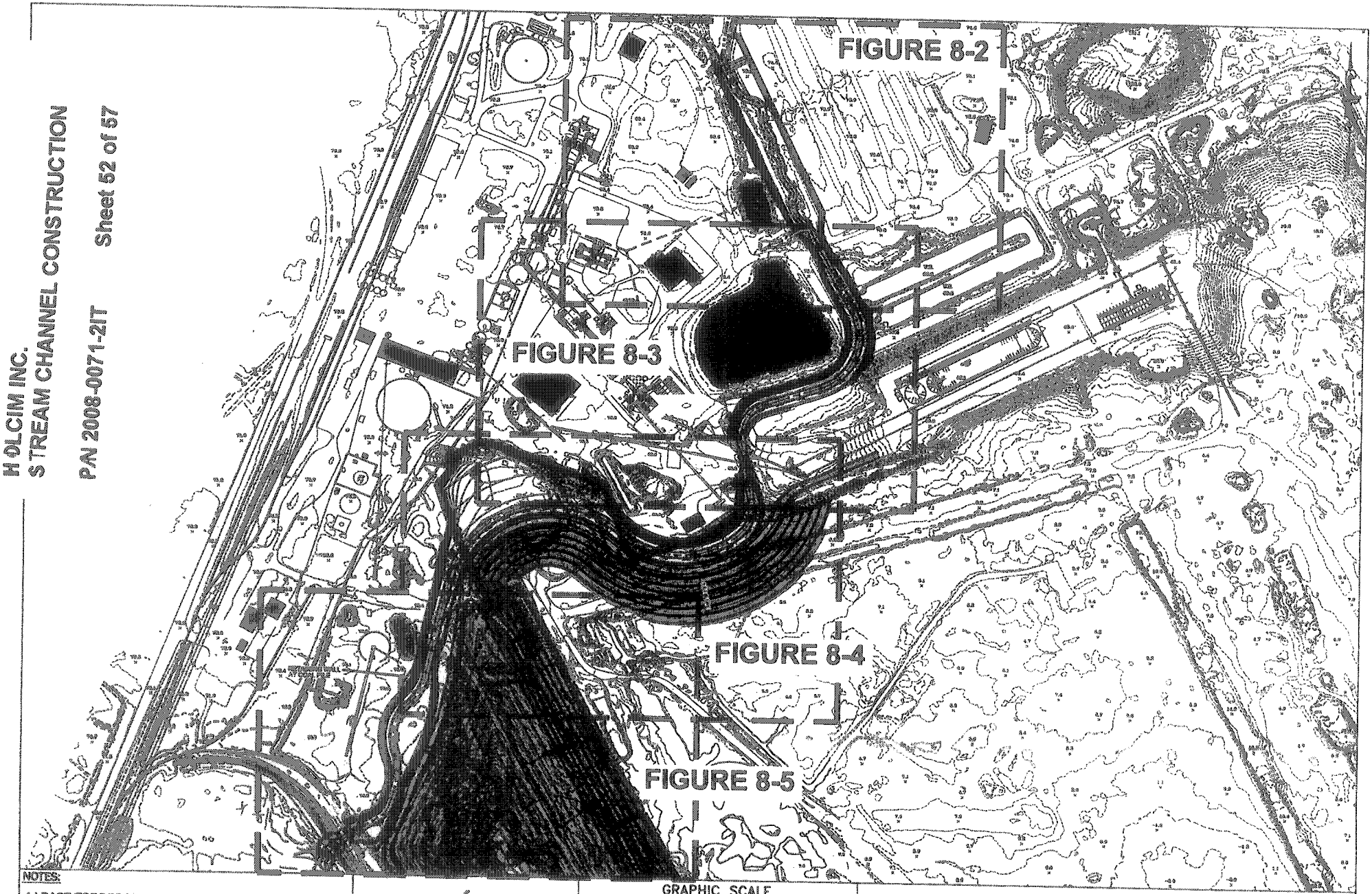

NOTES:

1.) BASE TOPOGRAPHY PROVIDED BY:
LANDAIR MAPPING
PEACHTREE CITY, GEORGIA
DATE OF PHOTOGRAPHY: JUNE 16, 2006

AND CKD SPOILS AREA BY:
WOLVERTON & ASSOCIATES
DULUTH, GEORGIA
DATE OF PHOTOGRAPHY: MARCH 24, 2007

GRAPHIC SCALE
300 0 300 600
SCALE: 1" = 600'

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DRAWN BY: J. COLEMAN
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LAYOUT: 8X11H-FIG 8-1
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FIGURE 8-1
OVERALL STATIONING PLAN
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION

P/N 2008-0071-21T Sheet 53 of 57

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
W.E.	= WATER ELEVATION
NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

GRAPHIC SCALE
100 0 100 200
SCALE: 1" = 200'

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LAYOUT: 8X11H-FIG 8-2
ORIGINAL DATE: 11/21/2007
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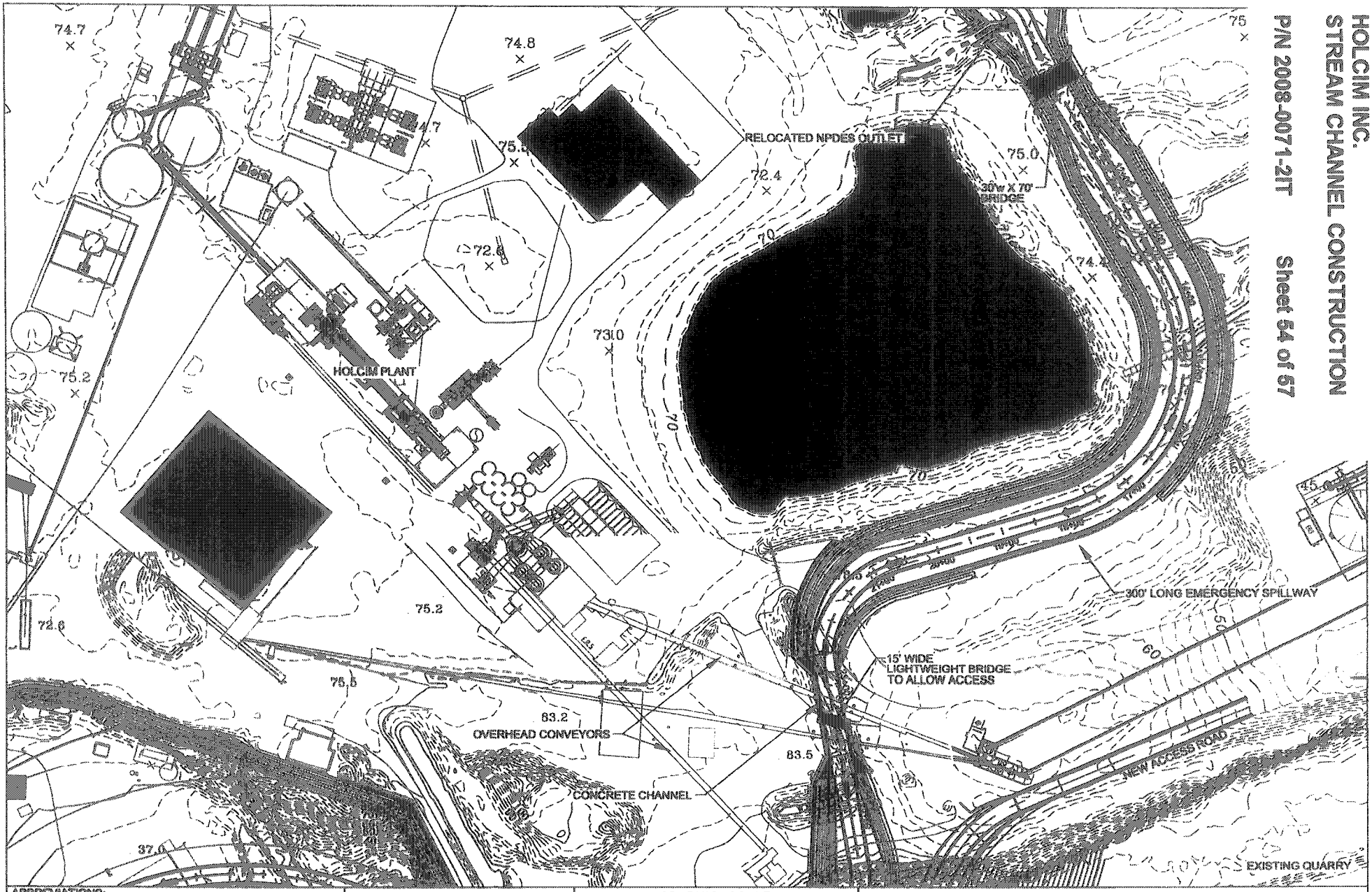
FIGURE 8-2
STATIONING PLAN - SEGMENT A
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION
P/N 2008-0071-2IT Sheet 54 of 57



ABBREVIATIONS:

EL.	= ELEVATION
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Ø	= DIAMETER
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MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
100 0 100 200
SCALE: 1" = 200'

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LAYOUT: 8X11H-FIS 8-3
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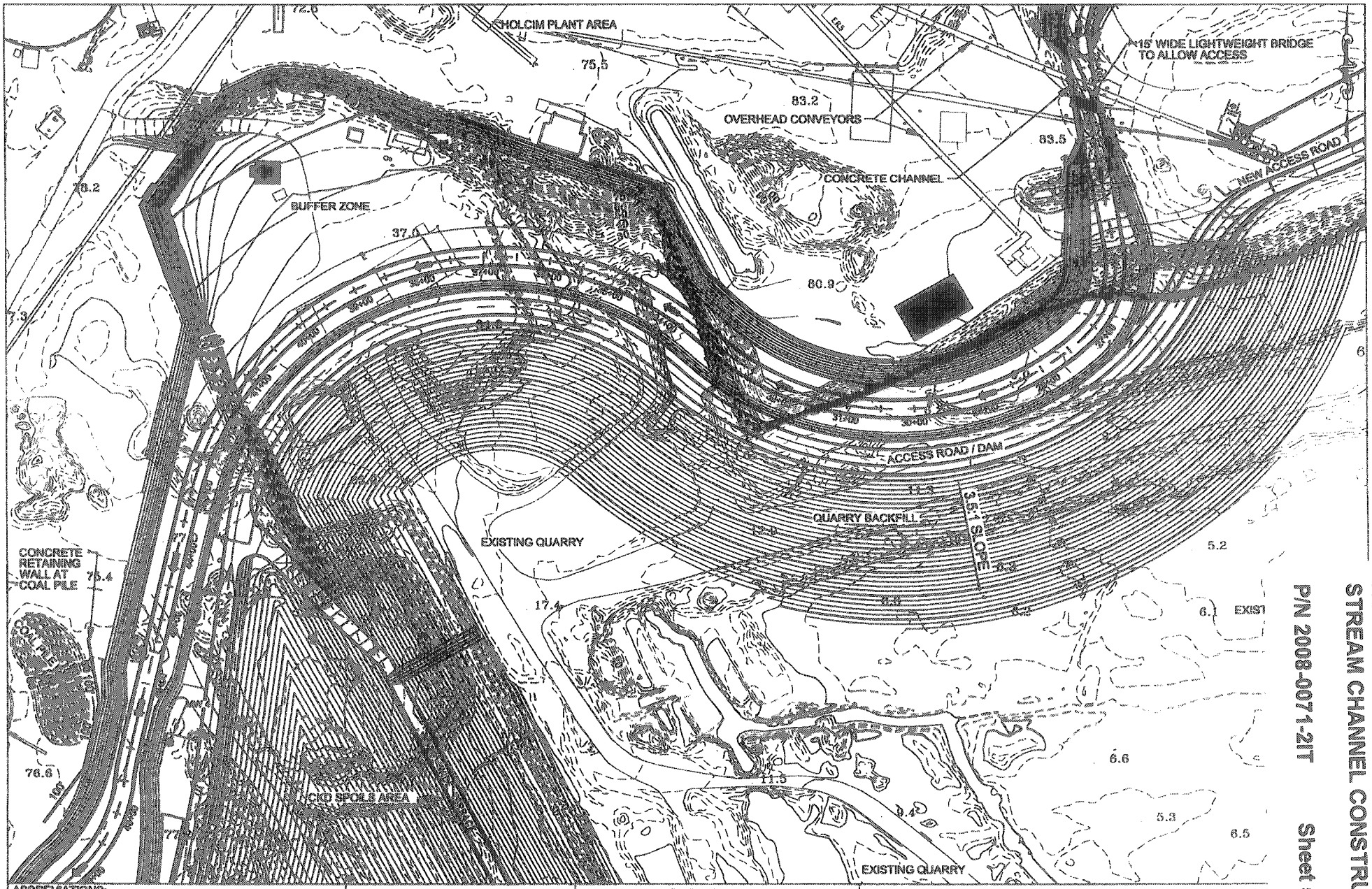
FIGURE 8-3
STATIONING PLAN - SEGMENT B
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA



ABBREVIATIONS:

EL.	= ELEVATION
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CKD	= CEMENT KILN DUST
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MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

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GRAPHIC SCALE
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SCALE: 1" = 200'

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LAYOUT: 8X11H-FIG 8-4
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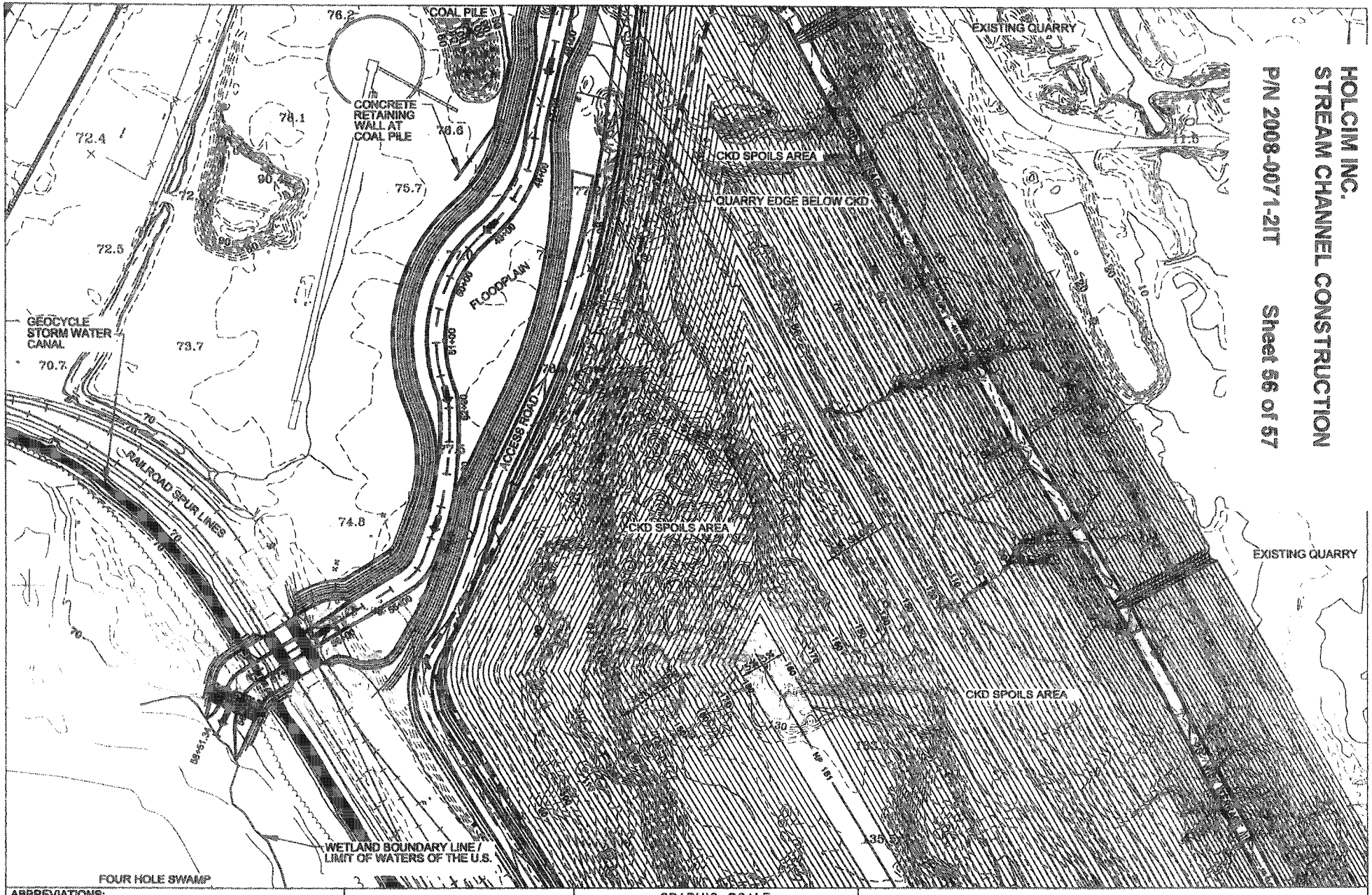
FIGURE 8-4
STATIONING PLAN - SEGMENT C
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

HOLCIM INC.
STREAM CHANNEL CONSTRUCTION
P/N 2008-0071-2IT
Sheet 55 of 57



HOLCIM INC.
STREAM CHANNEL CONSTRUCTION
P/N 2008-0071-2IT Sheet 56 of 57

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
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CKD	= CEMENT KILN DUST
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NPDES	= NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
MW	= MONITORING WELL
TYP.	= TYPICAL
TEMP.	= TEMPORARY
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GRAPHIC SCALE
100 0 100 200
SCALE: 1" = 200'

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PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 8-5
ORIGINAL DATE: 11/21/2007
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REV: A
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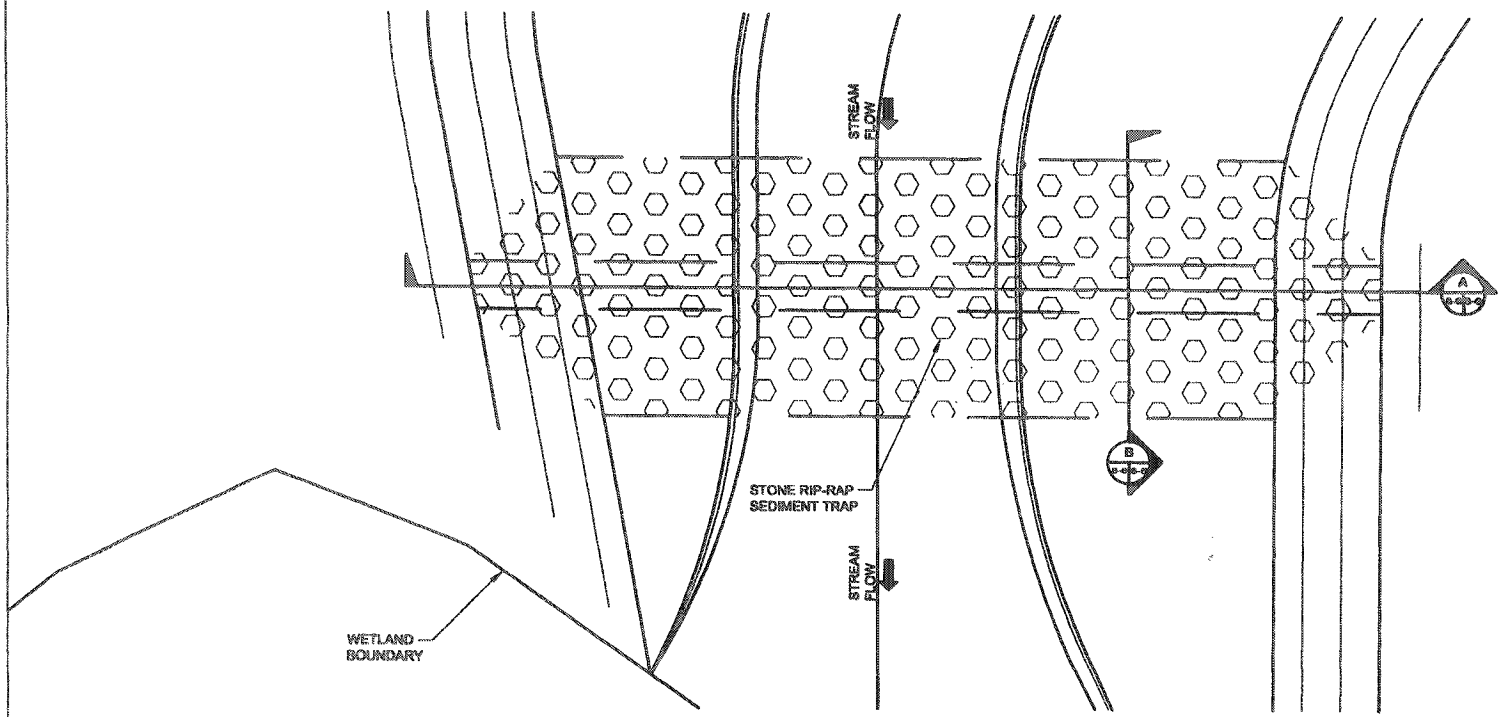
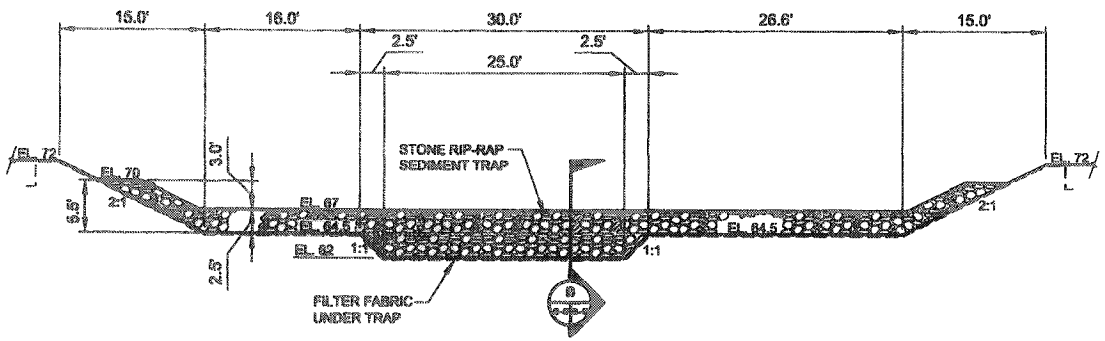
FIGURE 8-5
STATIONING PLAN - SEGMENT D
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA

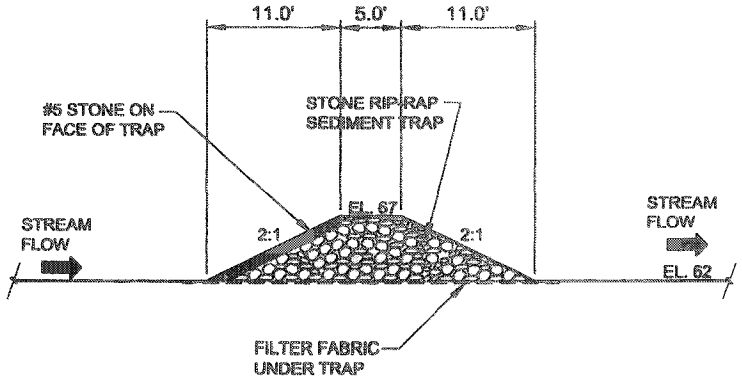
HOLCIM INC.
STREAM CHANNEL CONSTRUCTION
P/N 2008-0071-2T Sheet 57 of 57



DETAIL 4 (7-5 8-6)
SCALE: 1" = 20'



SECTION A (8-6 8-6)
SCALE: 1" = 20'



SECTION B (8-6 8-6)
SCALE: 1" = 10'

ABBREVIATIONS:

EL.	= ELEVATION
INV. EL.	= INVERT ELEVATION
Ø	= DIAMETER
CKD	= CEMENT KILN DUST
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TEMP.	= TEMPORARY
RCP	= REINFORCED CONCRETE PIPE

GRAPHIC SCALE
10 0 10 20
SCALE: 1" = 20'

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PROJECT MANAGER: M. TAYLOR
LAYOUT: 8X11H-FIG 8-6
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REV: A

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FIGURE 8-6
TEMPORARY SEDIMENT TRAP DETAILS
HOME BRANCH RELOCATION
HOLCIM (US) INC.
HOLLY HILL, SOUTH CAROLINA