SRG ENGINEERING, INC.
CONSULTING STRUCTURAL ENGINEERS

May 22, 2013
12-052.1

Mr. Tom Williams
Williams Construction, Inc.
29 Ocean Ave., Apartment 2
Portland, ME 04103

RECEIVED
MAY 24 2013
Dept. of Building Inspections
City of Portland Maine

55 Sherman Street Retaining Wall, Portland, Maine

Dear Mr. Williams:

We are the Structural Engineer of Record for the above referenced project.

We provided modular block retaining wall analysis and design in accordance with generally accepted design procedures as outlined in the latest edition of the NCMA Design Manual for Segmental Retaining Walls. We also provided construction monitoring in addition to reviewing Construction Observation Reports provided by S.W. Cole Engineering, Inc. (SWCE). SWCE was retained by SRG Engineering to perform construction observation services to help ensure compliance with our design drawings dated October 18, 2012.

Based on our observation of construction and review of Construction Observation Reports prepared by SWCE, we believe the Keystone modular block retaining wall was constructed in compliance with the plans and specifications.

Professional services rendered are believed to be consistent with others performing similar work in the geographic area at the time services were rendered.

We have attached a copy of our reports with related photos for your reference. Thank you for using SRG Engineering for your structural engineering needs.

Sincerely,

SRG ENGINEERING, INC.

Steven R. Grant, P.E.
President

STATE OF MAINE
STEVEN R. GRANT
No. 6825
LICENSED
PROFESSIONAL ENGINEER
5-22-13

SRG:srg
Enc.

c: File

FIELD REPORT #1 of 2

SRG Engineering, Inc.
P. O. Box 925
Gray, ME 04039-0925
Tel:(207)-657-7323 Fax:(207)-657-7342

Project #: **12-052.1**	Date: **May 14, 2013**
Project Name:	**55 Sherman Street Wall**
Project Location:	**Portland, Maine**
Weather Conditions:	**Mostly Sunny**
Contact Person(s):	**Steven Grant-SRG**
	Tom Williams-GC

Discussion/Obserations:

A. SRG conducted site visit today per request of Tom Williams and noted the following:
1. Contractor (GC) had 2 courses of block down and starting the 3rd course along the adjacent drive.
2. GC had wall geogrid reinforcement at correct location but with incorrect orientation. SRG told GC to take wall down to the 1st (and only) layer of grid and rotate the geogrid 90 degrees so it is in the correct orientation. I showed and explained to the GC that the geogrid indicates which direction the grid must be unrolled so that it is correctly orientated. Geogrid must be unrolled perpendicular to the wall face……they had it parallel before correcting.
3. GC removed existing block, and correctly orientated the 1st (and only at this time) layer of geogrid.
4. Geogrid lengths were correct.
5. Geogrid overlapped the block below correctly and was pulled taut prior to backfilling.
6. Reinforced backfill was ¾" crushed stone as specified. Crushed stone backfill was placed inside the block cores and also between the block units as specified.
7. Reinforced backfill was compacted with a vibratory plate compactor.
8. Keystone block pins were correctly located in each block to allow for correct wall batter. Block was brushed off prior to setting pins.
9. I told the GC that the wall geogrid is supposed to be level; however, each layer can be +/-10 degrees from horizontal.
10. Block was precut for the wall under drain outlets.
11. Corner block was observed to be erected correctly. SRG recommended the GC use wall cap adhesive at the corner block where there is no grid in order to help ensure a more stable corner.
12. Black perforated under drain (UD) pipe was present at the job site.
13. SRG noticed the GC had an unused full roll of Miragrid 2XT geogrid located near the Keystone block storage location adjacent to the building. SRG informed the GC that Miragrid 2XT IS NOT allowed to be used for wall construction, since all the grid must be Miragrid 3XT per plans. The GC indicated this unused roll of 2XT will be returned and replaced with 3XT.
14. SRG contacted S.W. Cole to have them provide continual on-site construction observation services that is required so that SRG may provide a PE stamped letter of acceptance when construction is done. (SWC time at the job site will be much less expensive than having SRG provide the same.)
15. Twenty-six (26) photos were taken for the record. Please see attached.

Copies To: Tom Williams via email/US Mail, SWC via email.

Signed:

STATE OF MAINE
STEVEN R. GRANT
No. 6825
LICENSED PROFESSIONAL ENGINEER
5/22/13

FIELD REPORT #2 of 2

SRG Engineering, Inc.
P. O. Box 925
Gray, ME 04039-0925
Tel:(207)-657-7323 Fax:(207)-657-7342

Project #: **12-052.1**	Date: **May 15, 2013**
Project Name:	**55 Sherman Street Wall**
Project Location:	**Portland, Maine**
Weather Conditions:	**Mostly Sunny**
Contact Person(s):	**Steven Grant-SRG**
	Tom William-GC
	V. Terrell and P. Otto-SWC

Discussion/Obserations:

A. SRG conducted an abbreviated site visit today mainly to obtain the signed contract from Tom Williams. We noted the following:
   1. Contractor was on course #5.
   2. Under drain was behind the wall and had acceptable outlet locations.
   3. Crushed stone backfill was placed and compacted inside block cores and between block units.
   4. Two people from S.W. Cole were present performing construction observation. I believe P. Otto just arrived shortly before my arrival in order to relieve V. Terrell. They indicated construction has been going good.
   5. SRG reviewed the construction of the 90 degree outside corners and find them acceptable.
   6. Two (2) photos were taken for the record. Please see attached.

RECEIVED
MAY 2 4 2013
Dept. of Building Inspections
City of Portland Maine

STATE OF MAINE
STEVEN R. GRANT
No. 6825
LICENSED
PROFESSIONAL ENGINEER

Copies To: Tom Williams via email/US Mail, SWC via email.

Signed: _____

S.W.COLE ENGINEERING, INC.

Soils Observation Report

Project Name/Location:	55 Sherman Street / Portland, ME	**Project No:**	13-0420
Client/Client's Rep.:	SRG Engineering/ Steve Grant	**Date:**	5-15-13
General Contractor:	Williams Construction	**Sheet:**	1 of 1
Earthwork Contractor:	Williams Construction	**SWCE Rep.:**	V.Terrell/ P. Otto
		Arrived at Site:	8:30am
		Left Site:	5:00pm

Weather

☒ Clear ☐ Snow ☒ Warm
☐ Overcast ☐ Fog ☐ Hot
☐ Rain ☐ Cold ☐ Windy

Site Conditions

☐ Wet ☐ Dusty
☐ Muddy ☐ Frozen
Temperatures: 60° to 70°

Materials Used

☐ Structural Fill ☐ Foundation Backfill
☐ Utility Bedding ☐ Subbase
☐ Base ☒ 3/4" crushed stone

Soils Work Performed: ☐ Site Prep ☐ Earthwork ☐ Planting Soils ☐ Building Earthwork ☐ Utilities Earthwork ☒ Retaining Wall

Compaction Equipment Used: ☐ Large Roller ☐ Small Roller ☐ Trench Roller ☐ Large Plate Tamp ☒ Small Tamp ☐ Jumping Jack ☐ _____ ☐ _____

Soils Observations	Observed		Comments
Site Preparation	Yes ☒	No ☐	
Fill Placement	Yes ☒	No ☐	Excavator, graded smooth
Material Type (proper material used for construction)	Yes ☒	No ☐	
Lift Size	Yes ☒	No ☐	8-inch maximum
Compaction	Yes ☒	No ☐	Vibratory Plate ~ 150 lbs
In-place Densities	Yes ☒	No ☐	
In-place Density Frequency	Yes ☒	No ☐	
Non-Conformance Items Observed	Yes ☐	No ☒	

Observations/Comments:

Williams Construction (W.C.) began construction of segmental retaining wall 5/14/13 and installed 1st four courses of wall from STA 0+36 to STA 0+70 to approximately elevation 51. Observation of construction performed on 5/14/13 by SRG Engineering. SWCE performed compaction tests 5/14/13 on ¾" crushed stone. Compaction tests performed indicate that the material was being compacted to a minimum of 95-percent of a 99.0-pcf dry rodded unit weight, as required. SWCE onsite 5/15/13 as scheduled by SRG Engineering to observe construction of proposed segmental retaining wall and to perform compaction tests as ¾" crushed stone. W.C. overexcavated uncontrolled fill and relic topsoil to expose native orange sand along STA 0+00 to STA 0+36 as required by project structural notes. W.C. compacted subgrade with a small vibratory plate compactor. Williams Construction installed a 12" rock leveling pad consisting of ¾" crushed stone overlying native orange sand subgrade at STA 0+00 to 0+36. W.C. installed Keystone 8"x12"x18" Compac Units with ½" x 5¼" fiberglass pins per structural plans. W.C. installed a black corrugated and perforated 4" diameter drain inside retaining wall at 1st course above grade with daylight drain tile through wall face. W.C. wrapped the drainpipe with non-woven geotextile fabric from STA 0+00 to 0+15 in order to prevent sand or sediment from clogging the pipe in the future. W.C. installed Miragrid 3XT geogrid at specified elevations as required on structural plans. W.C. pulled Miragrid 3XT geogrid taught prior to backfill. W.C. installed 3" of ¾" crushed stone between overlapping geogrid at corners as required. Williams Construction graded 8-inch lifts of ¾" crushed stone backfill as retaining wall block was installed and compacted each lift with multiple passes of a small vibratory plate compactor (Mikasa Multi-Quip). Compaction tests performed indicate that the material was being compacted to a minimum of 95-percent of a 99.0-pcf dry rodded unit weight, as required. W.C. had constructed retaining wall to approx. elevation 54 at STA 0+00 to STA 0+70 by the end of the day. Methods observed appeared consistent with project specifications.

Attachments: Photos Reviewed By: RED

S.W.COLE ENGINEERING, INC.

Report of Field Density

ASTM D6938

Project: **PORTLAND ME - 55 SHERMAN STREET - CONSTRUCTION MATERIALS TESTING SERVICES** Project Number: **13-0420**

Client: **SRG ENGINEERING, INC.**

Field Density Test Results

Test #	Test Date	Tech	Test Location	Elev Feet	Test Depth	Lab ID	Dry Density	Moisture Content Percent	Compaction Percent	Required Compaction
1	5/15/2013	VLT	STA 0 + 25, BASE OF RTW	52	BS	16794G	99.9	0.7	100.9	95
2	5/15/2013	VLT	STA 0 + 15, BASE OF RTW	52.67	BS	16794G	97.9	0.7	98.9	95
3	5/15/2013	VLT	STA 0 + 60, 2' INSIDE WALL	53	BS	16794G	100.3	0.7	101.3	95
4	5/15/2013	VLT	STA 0 + 40, 3' INSIDE WALL	53	BS	16794G	96.4	0.7	97.4	95
5	5/15/2013	VLT	STA 0 + 35, 3' INSIDE WALL	54	BS	16794G	99.0	1.0	100.0	95

Laboratory Compaction Test Reference

Lab ID	Date Received	Material Source	Material Type	Method	Max Dry Density PCF	Optimum Moisture Content (%)	Comments
16794G	5/15/2013	On Site Stockpile	3/4" Stone	ASTM C-29	99.0		Dry Rodded Unit Weight

Elevation Notes:
ALL ELEVATIONS ARE +/-

Comments:
STA - STATION
BS - BACK SCATTER
RTW - RETAINING WALL

Reviewed By

S.W.COLE ENGINEERING, INC.

Report of Field Density
ASTM D6938

Project: **PORTLAND ME - 55 SHERMAN STREET - CONSTRUCTION MATERIALS TESTING SERVICES** Project Number: **13-0420**

Client: **SRG ENGINEERING, INC.**

Field Density Test Results

Test #	Test Date	Tech	Test Location	Elev Feet	Test Depth	Lab ID	Dry Density	Moisture Content Percent	Compaction Percent	Required Compaction
6	5/16/2013	VLT	STA 0 + 50, 2' INSIDE WALL	54	BS	16794G	99.0	1.0	100.0	95
7	5/16/2013	VLT	STA 0 + 20, 2' INSIDE WALL	54	BS	16794G	100.3	1.0	101.3	95
8	5/16/2013	VLT	STA 0 + 55, 4' INSIDE WALL	54.6	BS	16794G	97.2	1.0	98.2	95
9	5/16/2013	VLT	STA 0 + 25, 2' INSIDE WALL	54.6	BS	16794G	101.0	1.0	102.0	95
10	5/16/2013	VLT	STA 0 + 51, 2' INSIDE WALL	55.7	BS	16794G	95.9	1.1	96.9	95
11	5/16/2013	VLT	STA 0 + 35, 2' INSIDE WALL	55.7	BS	16794G	96.3	1.3	97.3	95
12	5/16/2013	VLT	STA 0 + 10, 2' INSIDE WALL	55.7	BS	16794G	98.9	1.1	99.9	95

Laboratory Compaction Test Reference

Lab ID	Date Received	Material Source	Material Type	Method	Max Dry Density PCF	Optimum Moisture Content (%)	Comments
16794G	5/15/2013	On Site Stockpile	3/4" Stone	ASTM C-29	99.0		Dry Rodded Unit Weight

Elevation Notes:

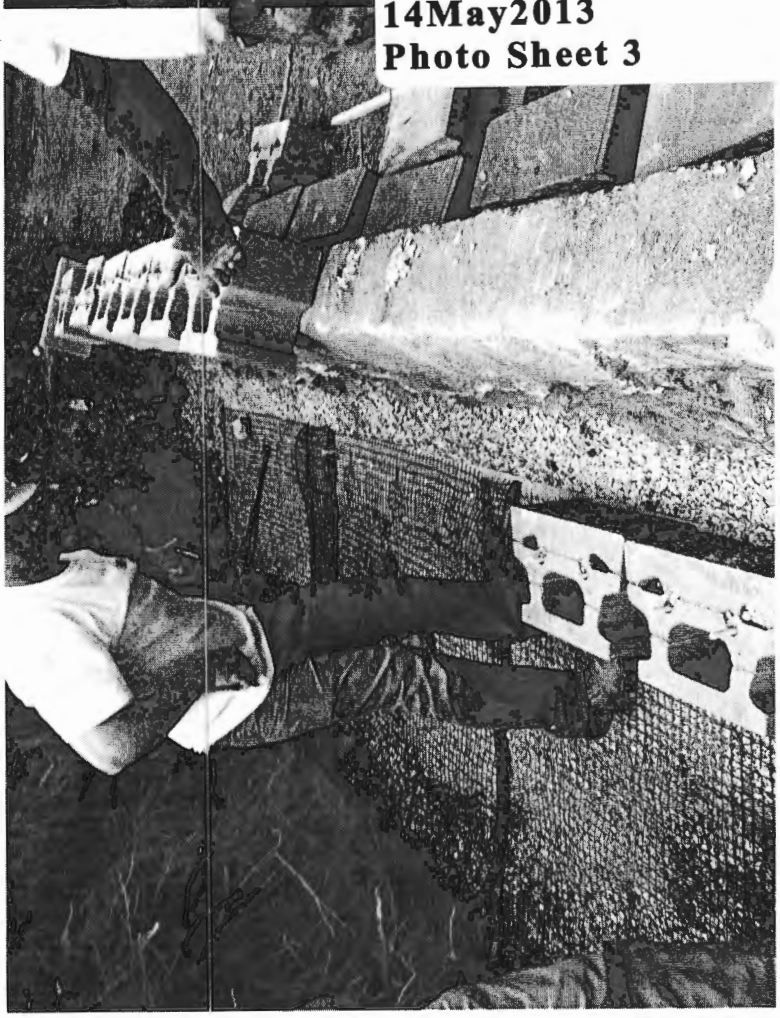
Comments:
STA - STATION

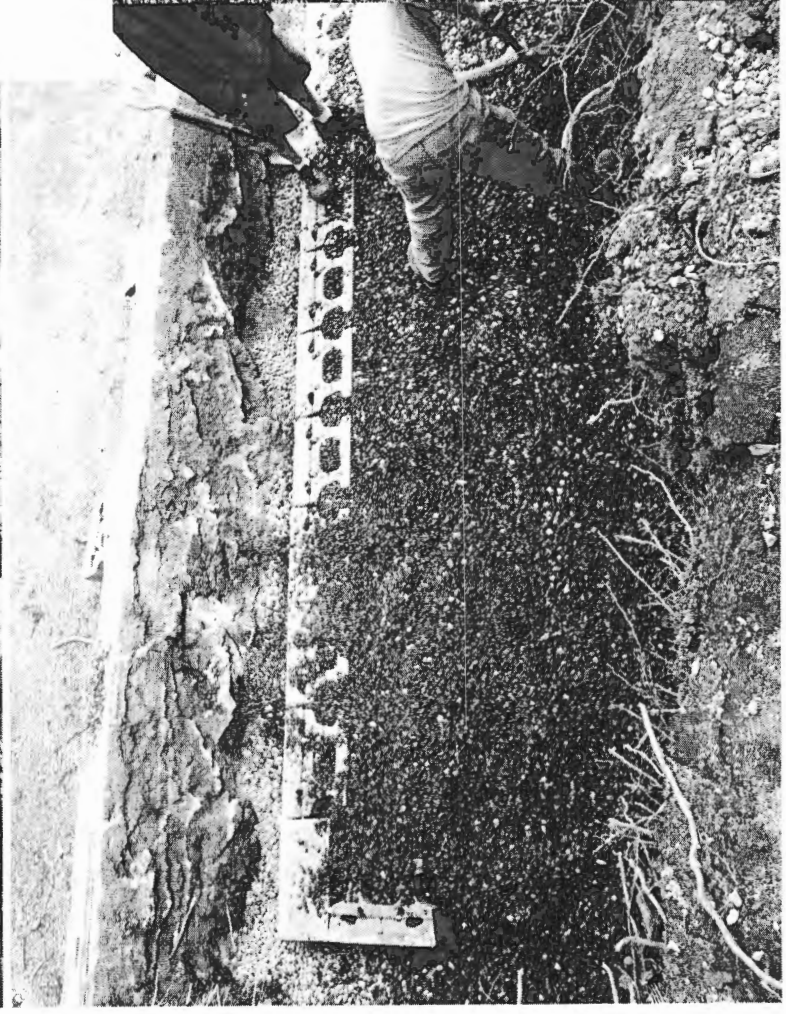
Reviewed By

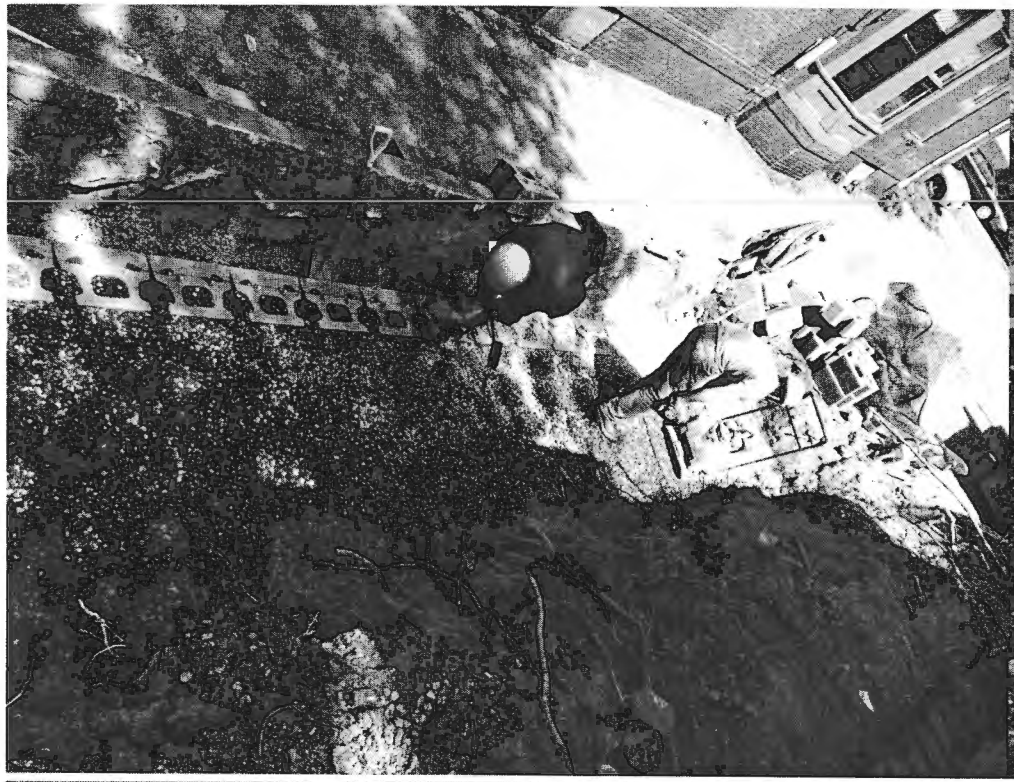
SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 1

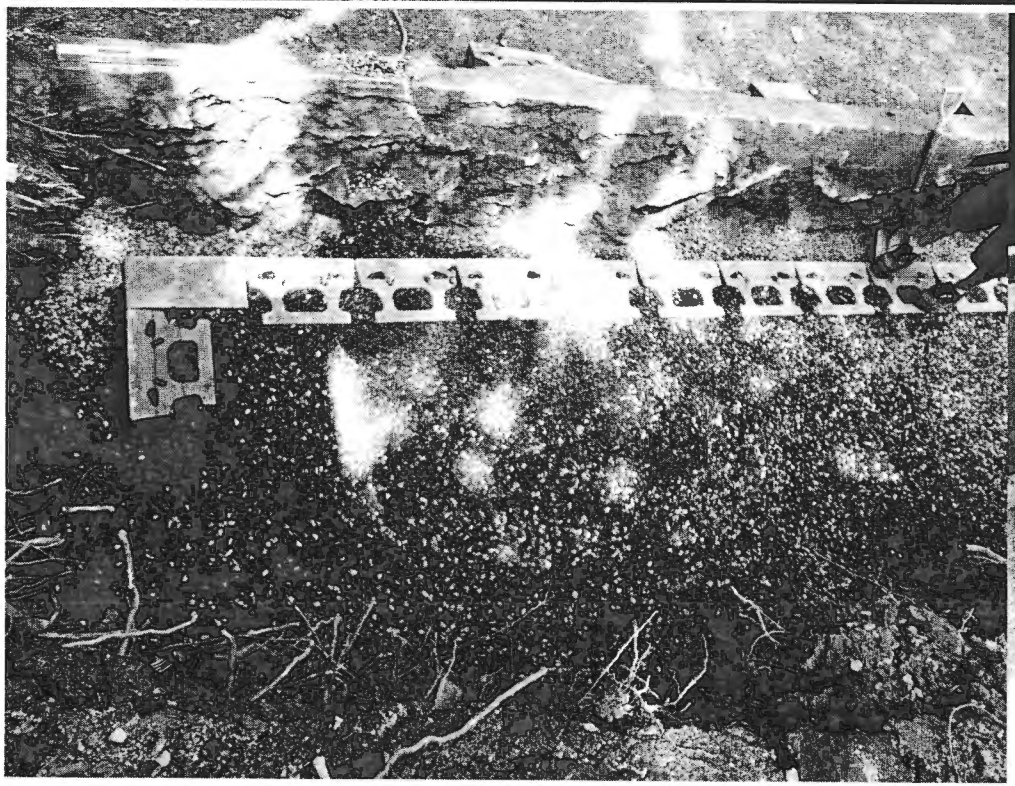
SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 2

SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 3

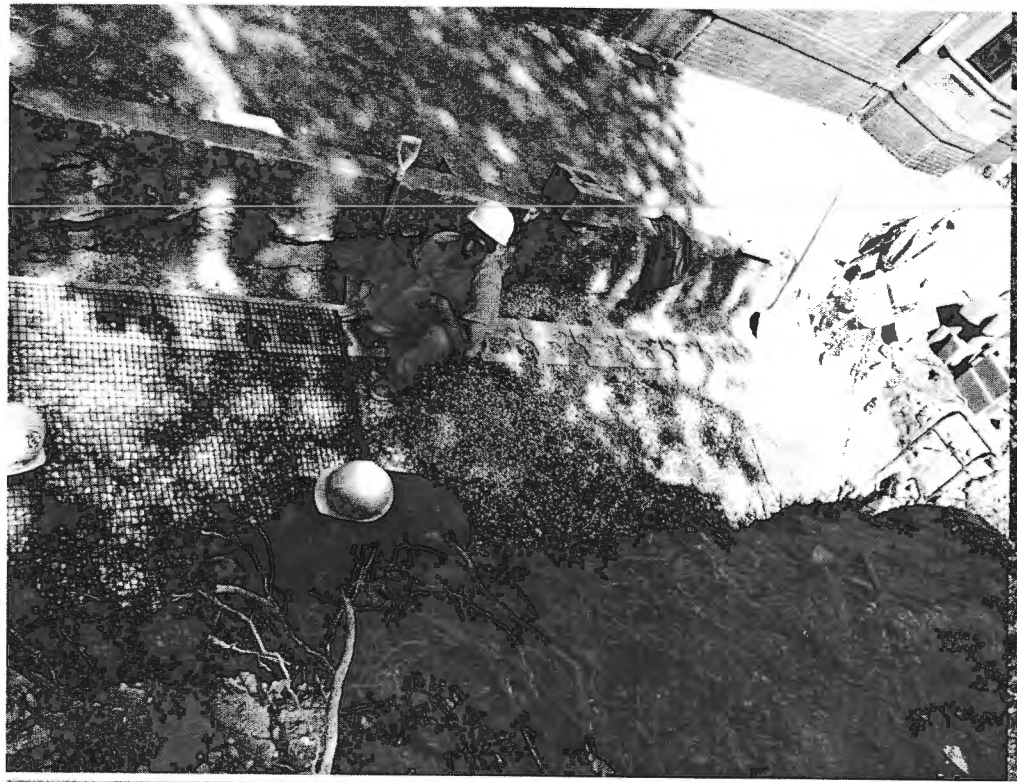


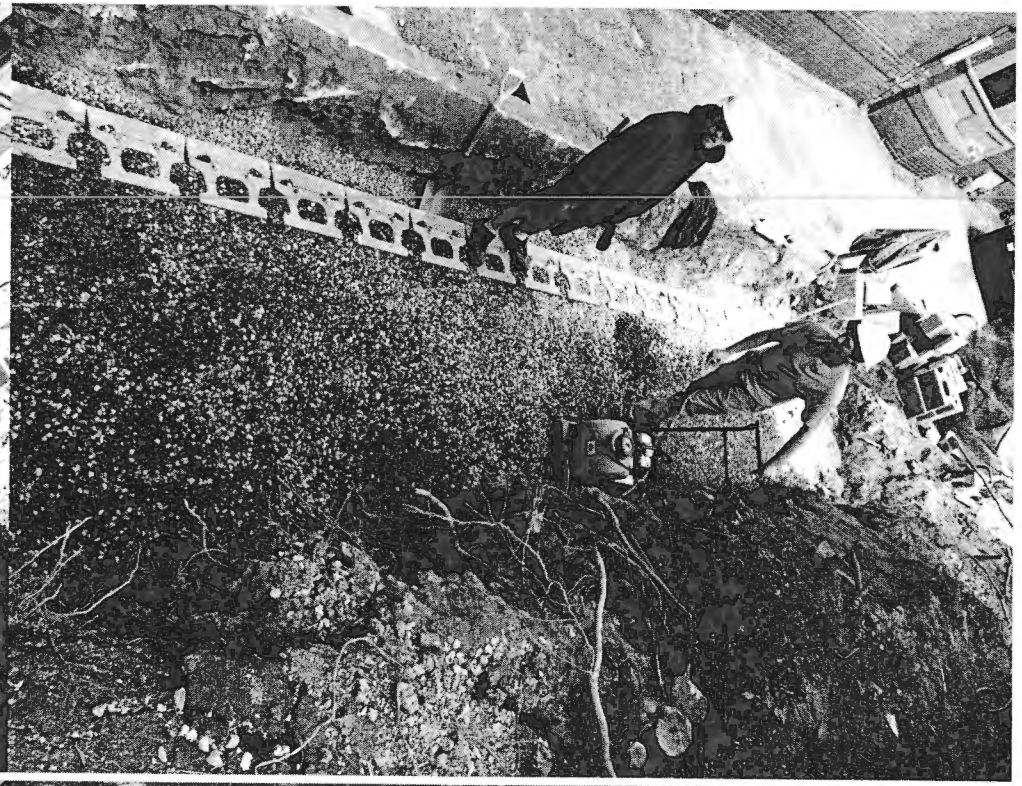


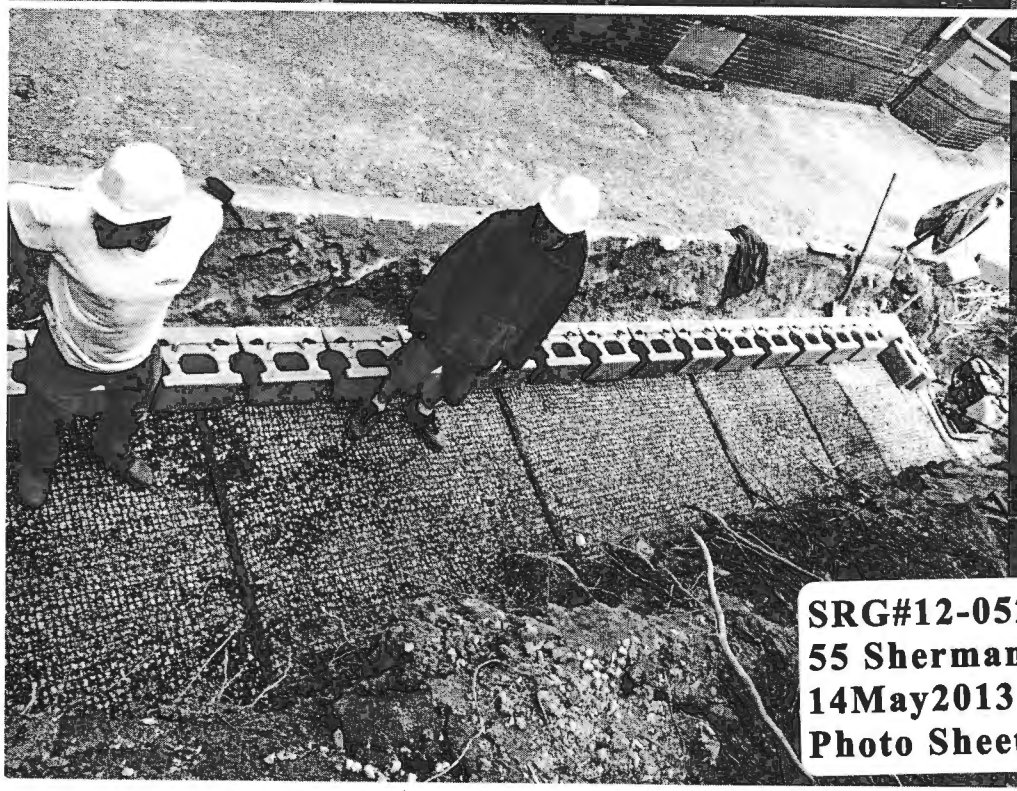


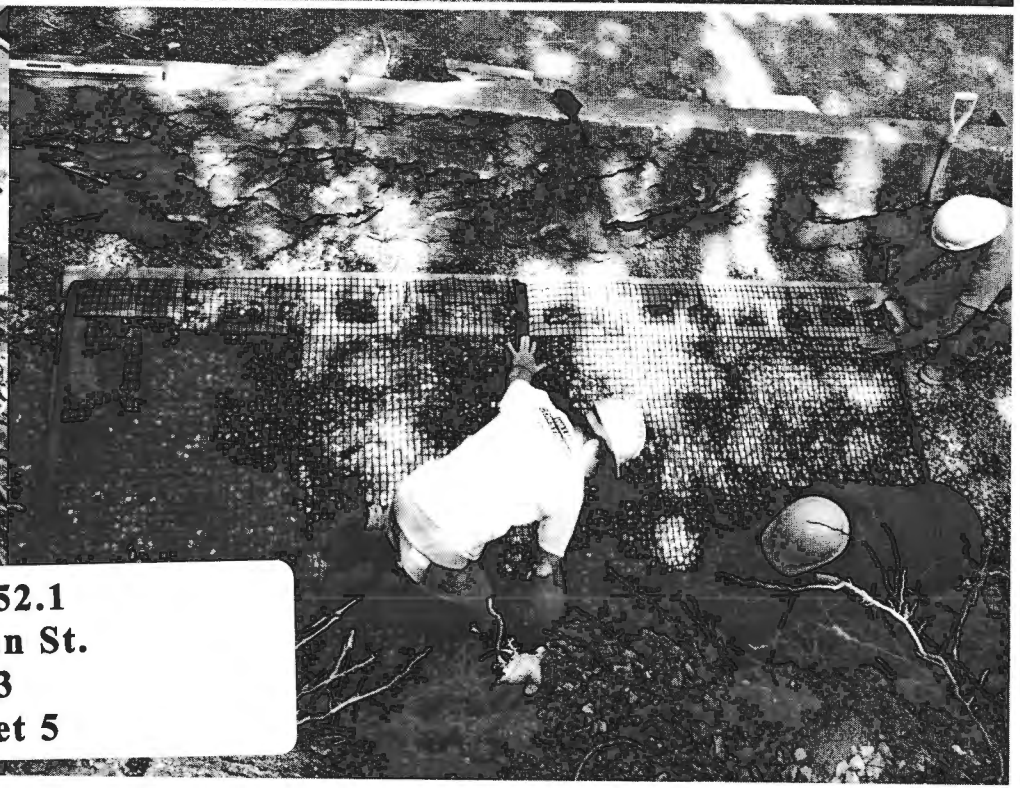


SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 4

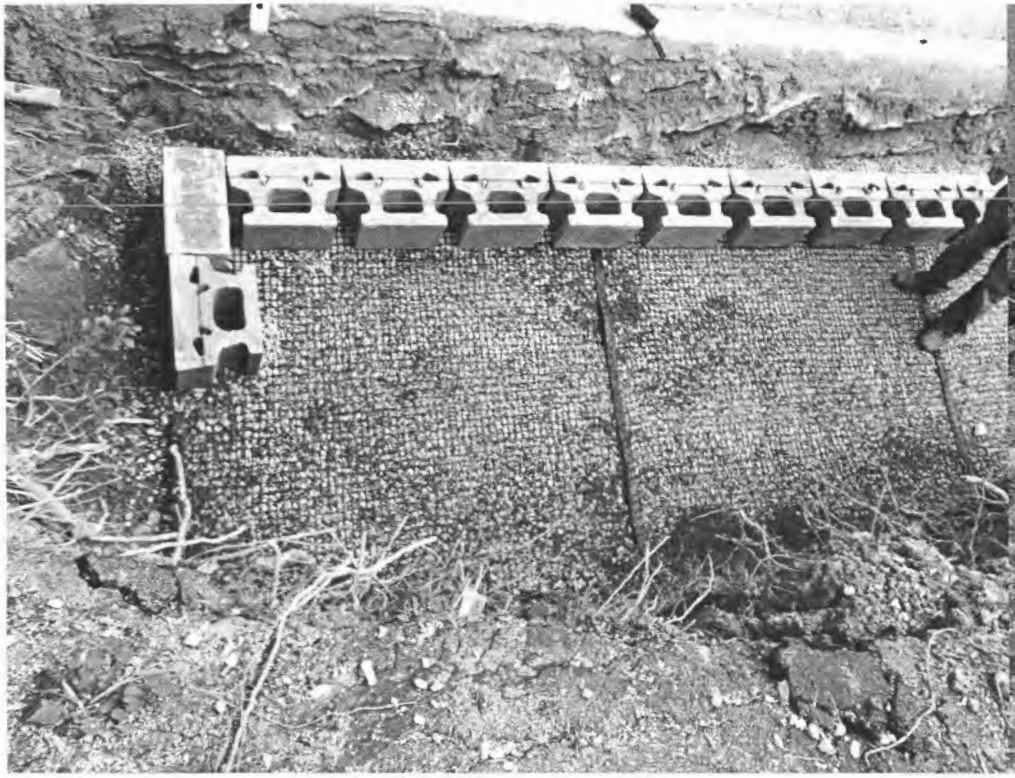


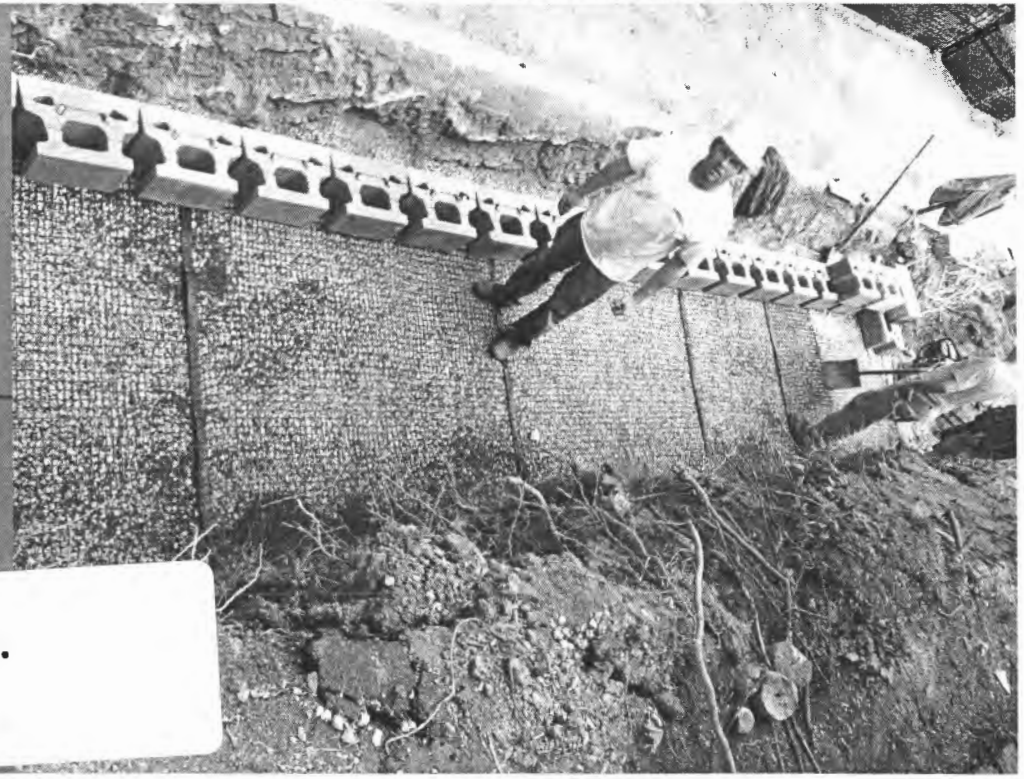




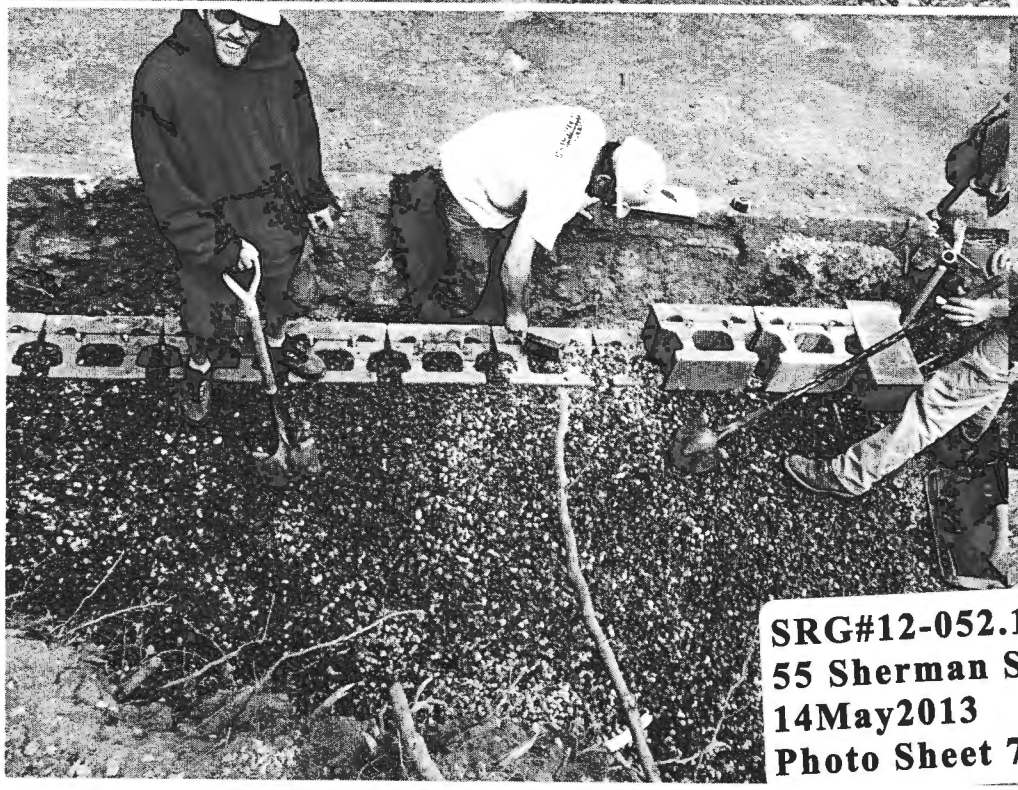


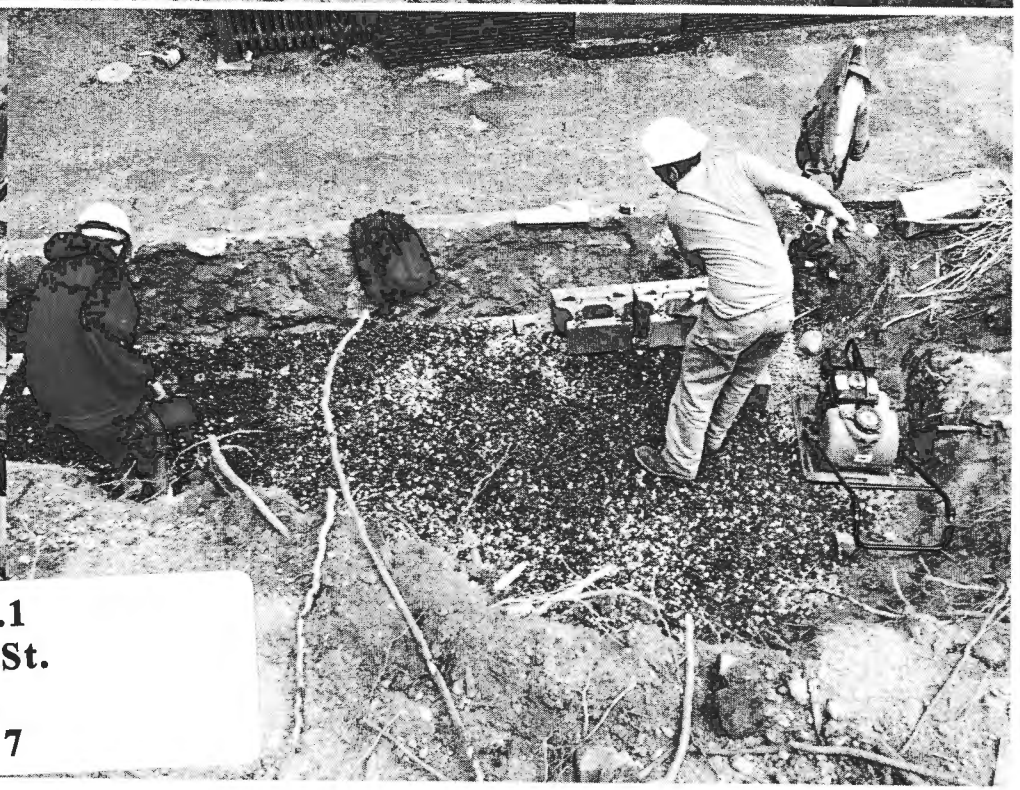
SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 5





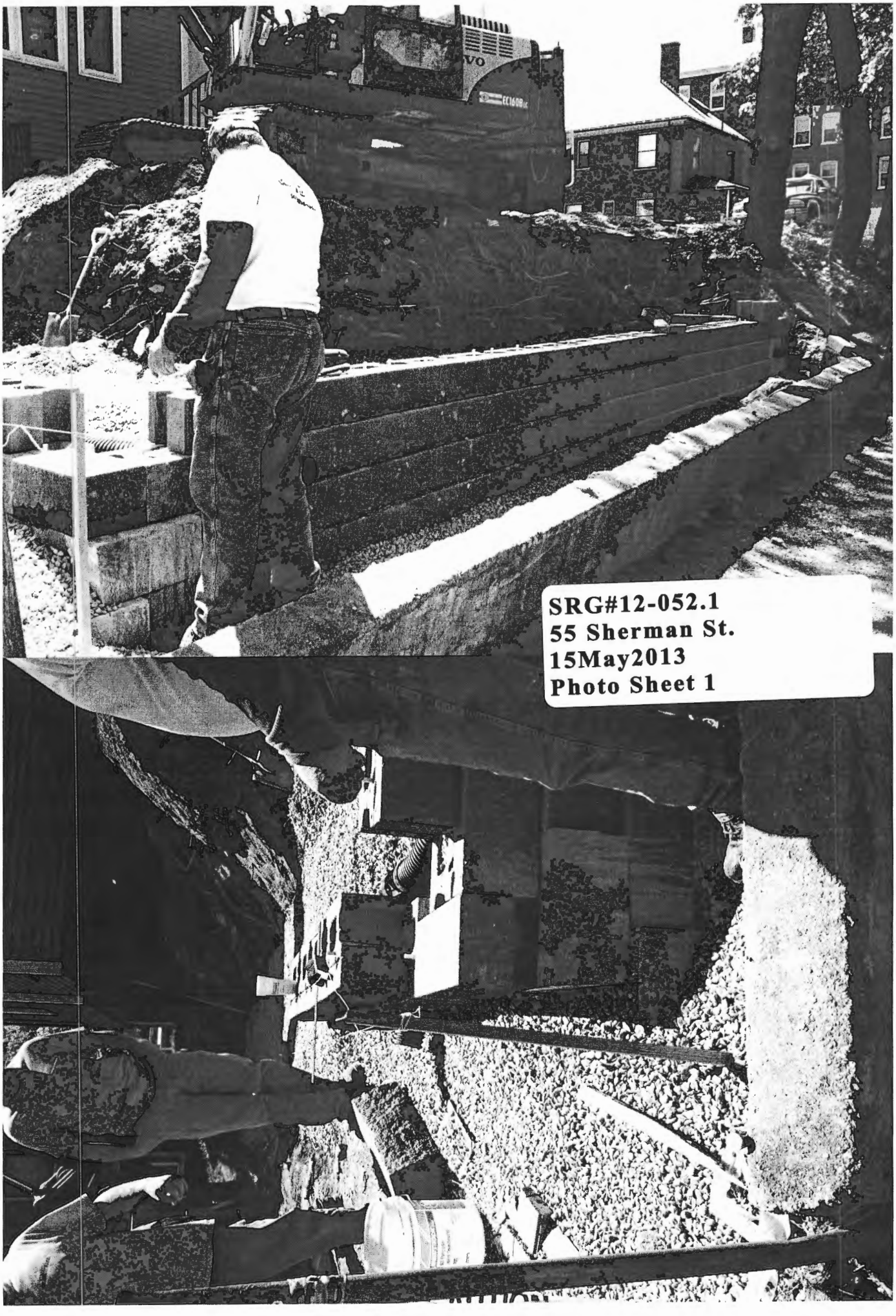
SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 6

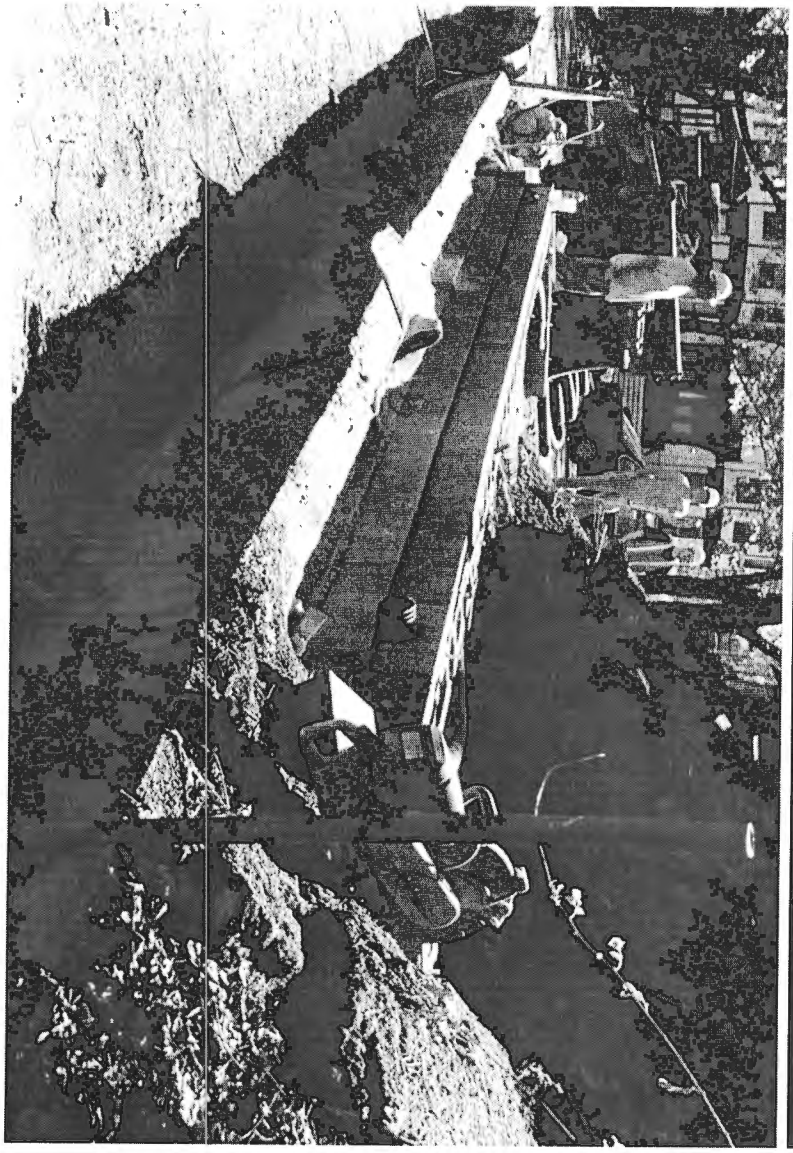




SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 7

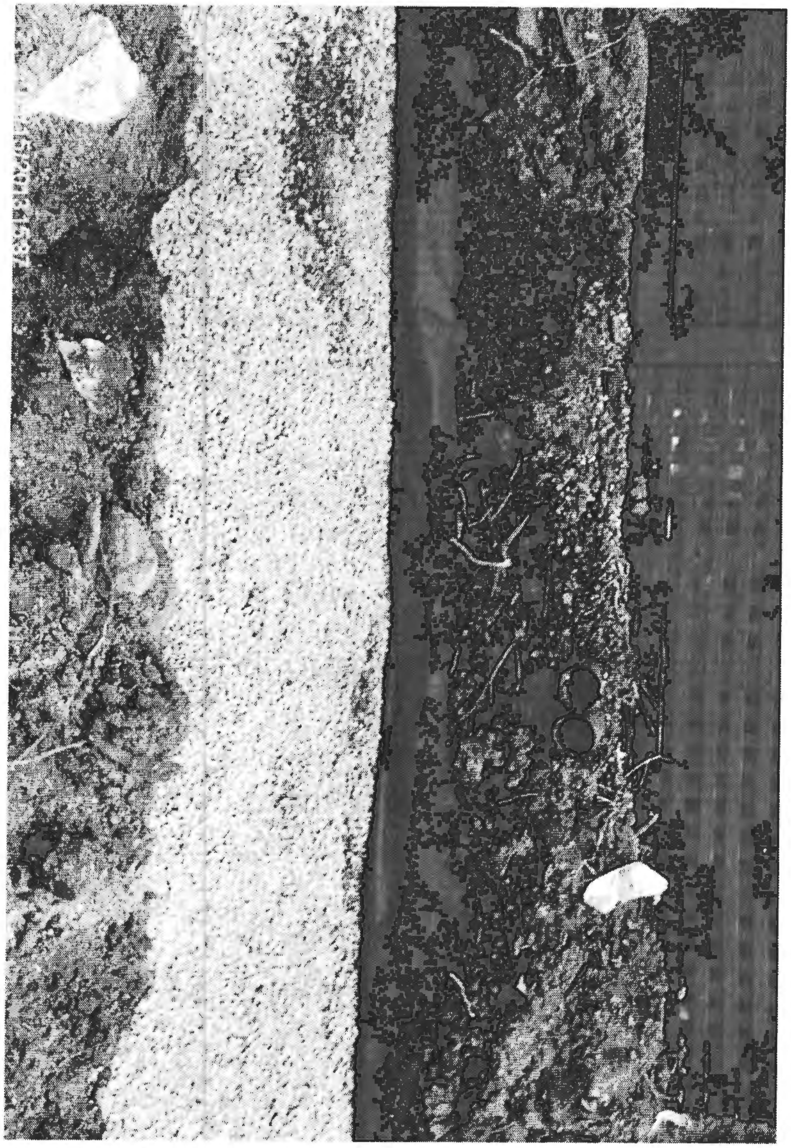
SRG#12-052.1
55 Sherman St.
14May2013
Photo Sheet 8

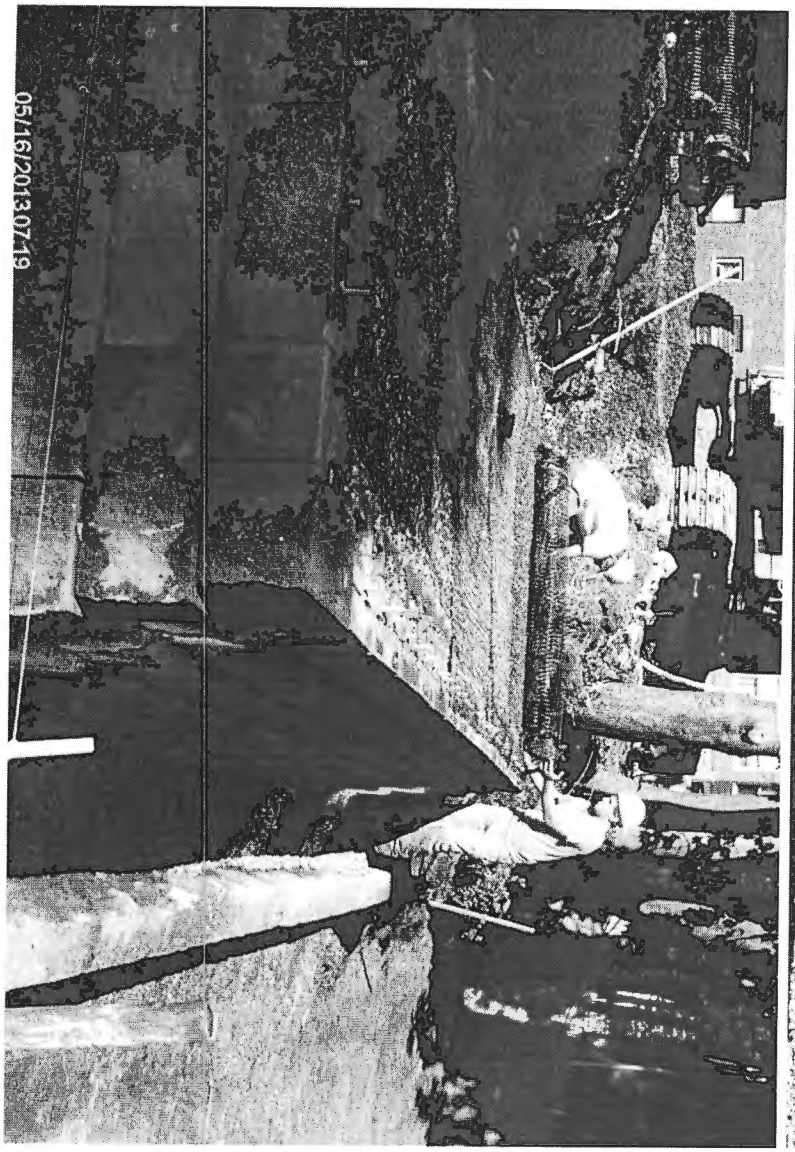

SRG#12-052.1
55 Sherman St.
15May2013
Photo Sheet 1




05/15/2013 09:30


05/15/2013 14:24




05/16/2013 07:19


05/16/2013 07:19


05/16/2013 07:19


TenCate
Miragrid
3XT/6/150
032213282
05/16/2013 09:13


05/16/2013 07:34