HSPV 739-301 SEMINAR IN ARCHITECTURAL CONSERVATION: MASONRY
Graduate Program in Historic Preservation/Weitzman School of Design/University of Pennsylvania
Fall 2024 / Wednesday 8:30 am-11:30 am EST/ MEY B6 & Various

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Office hours: Virtually by Appointment

Introduction

Masonry has commonly been used to construct buildings in North America since the early era of colonization. It was used to construct both vernacular and polite architecture because of local accessibility, material durability, and its association – engendering a sense of monumentality, strength, longevity, and connection with significant masonry structures of the ancient world. First stone, brick, and adobe were utilized until the Industrial Revolution, in which new masonry materials were developed to produce cheaper imitations of ornamental stone construction. Due to its use in significant public and private buildings as well as its superior durability, many of today's existing heritage buildings are constructed entirely or partially of masonry materials. However, masonry cannot perform into perpetuity without maintenance or repair and has a host of material conditions caused by intrinsic and extrinsic deterioration mechanisms. With proper project preparation, condition assessment, development of well-tailored preservation maintenance and repair plans, and treatment execution by skilled craftworkers, these buildings can be preserved for generations to come.

Course Summary

The primary goals of this course are for students to strengthen their critical thinking skills through technical application, and to encourage and hone their ability to observe. These skills will be developed through the practice of identifying masonry materials and systems, analyzing and recording properties and conditions, selecting instrumental and field methods to evaluate deterioration, developing strategies for treatment repair and recognizing potential project parameters. In addition, students will be further introduced to the role of conservator within a larger project structure, when they implement treatments, and how they communicate with consultants, design professionals, and masonry craftworkers.

The first half of this course offers an in-depth review of masonry materials, quarrying and manufacturing practices over time, construction technologies, unit and system deterioration, and methods of instrumental analysis. Attention will be paid to a variety of masonry and related materials such as stone, brick, terra cotta, cast stone, and mortars. The second half of the course will focus on treatment repair of masonry buildings and monuments as well as post-treatment analysis. Lab and field exercises along with a semester long site project will be offered to supplement lectures and to provide more practical experience for students.

Course Requirements

Attendance

Attendance is required for all scheduled classes, mid-term and final presentation sessions, unless permission for absence has been granted by the instructor in advance. In the event a student cannot attend, students are **required** to notify both instructors of their anticipated absence as soon as possible. More than three unexcused absences will result in a reduction of a student's overall grade by one letter. An absence will be excused for personal/family emergency, injury, illness, or attendance to another sanctioned university obligation. In-class lectures and working sessions will not be recorded in any capacity, and therefore will not be distributed to absentees.

Lateness

If a student anticipates being more than 5 minutes late from the official start time of class, they are **required** to notify both instructors, and to provide an estimated time of arrival. If students are more than 20 minutes late from the official start time of class, it will be counted as an absence. Being late (between 5-20 minutes) three times will be counted as one unexcused absence.

Participation

As a seminar, all students are expected to participate equally beginning with class attendance, discussion participation, and contributions of individual and/or group assignments. All work must follow the universities standards for academic integrity listed at the following link:
https://catalog.upenn.edu/pennbook/code-of-academic-integrity/

Classroom Etiquette

- Technology
    - Computers/Laptops/Tablets, Cell Phones, Ear Buds: these items are **not permitted** to be used during class time unless specified by the instructors. These items are expected to be put away, out of sight, during the active class period. If an exercise is planned that will require a laptop, students will be notified in advance. Students may take handwritten notes in class.
    - Use of AI: students may use AI to assist research and finding scholarly sources. Students are encouraged to vet those sources once they are collected through AI, to make sure they are indeed scholarly. Oppositely, students are **discouraged** from using AI to edit or generate written text, as it is often incorrect and uncontextualized in its technical terminology and phrasing. AI also often draws from unconventional and non-scholarly sources. The instructors may ask students to rewrite and resubmit assignments if it is clear AI has produced or edited their work.

- Professionalism
    - While in class, students are encouraged to behave as if the class is a workplace. The instructors will encourage a professional and polite working environment. When a lecture is

in session, students are expected to give their full attention to the speaker. If students display rude or disrespectful behavior toward others while in class, the instructors may ask them to leave the class or their final grade may be lowered.

Lab Assignments

Analytical and treatment labs have been developed to support the lecture component of the course. Labs will require coordination and use of the architectural conservation lab with various materials and with other courses. Please be respectful of others working in the lab, both from a safety and logistical standpoint. All proper lab safety, personal protective equipment (PPE) protocol, and material handling and disposal must be followed. You will be evaluated based on your compliance with these safety standards. If it is discovered that such protocol is not being followed, action will be taken and a reduction in grading may occur.

Site Project

One site with multiple structures, distinct features, and materials has been pre-selected for this project. Each student will prepare and conduct:

- Brief Archival Research – Provide a brief introduction to the building: including construction, repair and maintenance history, and site context. It is important to keep this section of the report concise and relevant to the specific monument or building. (No more than 500 words).
- Materials Characterization –Identify and describe each type of masonry and mortar materials used in the construction of your building. The description of each material should be at the macro and micro level, supported by published scholarly sources. This information will provide context for further discussion of these materials (and their deterioration) throughout the report.
- Drawing Set w/ Ortho-Rectified Photo-Elevations – Prepare a CAD drawing set with elevations, plan (& roof plan if applicable), along with orthorectified photographic elevations. Drawings do not need to include measurements but should be drafted at a reasonable scale and a graphic scale included on each sheet..
- Graphic Condition Survey Drawings Set – Use your CAD drawing set to document and graphically represent the conditions observed on your building.
- Graphic Conditions Glossary – Develop a conditions glossary or table that includes a photograph of each typical condition (with a scale card), a brief written description of the condition, and the graphic used to indicate that condition on the condition drawing set. Review resources such as the ISC glossary and others found in the distribution folder for guidance.
- Prioritized Conditions Report – This is your opportunity to synthesize all the data collected into a concise narrative that describes an educated hypothesis of why the building is deteriorating. Begin this section with a brief listing of the overall conditions observed and their sources with a priority level assigned to each, as well as definitions of priority criteria. Typically, priorities may fall within these categories, however each site might have unique or extenuating circumstances which elevate certain conditions to higher or lower condition levels. Consider the required sequencing of treatments when prioritizing conditions (i.e. repointing may be lower priority than structural grouting, but repointing must take place before structural grouting to contain the grout flow).

- Priority 1 – (High) Conditions pose potential risk to public safety or immediate loss of historic fabric. Repairs should be implemented within 1 year.
- Priority 2 – (Moderate) Conditions pose continued deterioration of historic fabric. Repairs should be implemented within 2-5 years.
- Priority 3 – (Low) Conditions pose very little loss of historic fabric. Repairs should be implemented within 5-10 years (or not at all)

This prioritized list of conditions should be followed by an in-depth **holistic explanation** of how and why the building you have assessed is deteriorating. You should discuss the overall site issues that contribute to the performance and deterioration of the structure (local climate, air pollution, site drainage, site vegetation, etc). These contextual insights should help you then explain the source and symptoms of the building system and unit conditions through a "systems-thinking" approach.

- Treatment Testing/Mock-Up Program should be outlined in the final section. Possible appropriate treatments and intervention approaches should be selected and outlined according to the previously stated prioritized conditions and defended by the use of relevant case studies, research, or building science literature. The means and methods of testing different treatments/interventions should also be summarized.
- Cleaning Test Report & Mortar Formulations (When applicable) include these in the appendices.

Course Submissions

All assignments should be submitted to the corresponding folders on **PennBox** in PDF format compressed to the lowest possible file size without resulting in reduced legibility. All assignments are due by Midnight (11:59 PM) on the specified date, unless otherwise noted by the instructors.

Assignments submitted late (after 11:59 PM on the specified date) will receive an automatic reduction of a third of a letter grade for each day thereafter. If a student anticipates in advance the need for an extension, for a legitimate reason (personal/family emergency, injury, illness, or attendance to another sanctioned university obligation) they are required to notify both instructors as soon as possible and receive approval.

There are several benchmark deadlines for site projects and lab assignments throughout the course of the semester. Students are expected to look at the schedule and plan their time accordingly to ensure theses deadlines are met.

All written assignments submitted are expected to be complete, utilizing an expository writing style, with correct spelling, proper grammar, appropriate tense, and professional formatting.

Final Presentation & Paper

The Final Presentations & Papers are to be fully documented with illustrations, citations and bibliography. (Examples of previous student work can be found in the course folder and should be used as reference only). Documentation and report for each student project should be unique to the selected site and project

requirements. With the exception of sickness, injury, or family emergency, all late papers will be penalized by an automatic reduction of a half of a letter grade for each day thereafter.

Sources and Citation

Students are expected to seek out scholarly sources that consist of primary or secondary research written by technical experts or academics within the preservation field or a related field of study. It is stressed the students find sources that are current but also published from a reputable source. Sources can consist of books, archival research, and scholarly and/or peer-reviewed articles. Sources should be cited in Chicago or APA style. You can learn more about Citation Style through Penn Libraries.

Grading

General	Class Attendance/Participation/Quizzes	10%
Site Project Submission #SP1	Archival Research & Material Characterization	5%
Site Project Submission #SP2	Drawing Set w/ Orthorectified Photography	10%
Site Project Submission #SP3	50% Draft & Presentation w/ Condition Drawing Set & Conditions Glossary	10%
Site Project Submission #SP4	Prioritized Conditions Report	10%
Site Project Submission #SP5	Draft Testing Program & Treatment Recommendations	5%
Site Project Submission #SP6	100% Final Draft	10%
Site Project Submission #SP7	Final Report & Presentation	30%
Treatment Assignment #TA1	Masonry Cleaning	5%
Treatment Assignment #TA2	Mortar Formulation	5%

Grading will be in accordance with general academic policies: a grade of A/A- will represent exceptional work, B/B+ will represent good work that meets the academic standard set for the course, and B- will represent work that is just under the established standard. C and C+ are barely passing for graduate courses and will indicate work that is less than satisfactory. Failure to meet the minimum requirements will result in an F. All work is to be delivered on the dates described in the syllabus or agreed upon in class if changed. (It is generally assumed that graduate students devote a minimum of 2 hours of study for every hour of class- time per week. We would suggest reserving 6 hours of non-class time each week for the seminar.)

Course Schedule

Class 1 (8/27)	**Course Introduction, Historic Masonry Building Technology & Deterioration Mechanisms** Instructors: **Casey Weisdock** & Roy Ingraffia
Location: West Laurel Hill Cemetery – Conservatory 225 Belmont Ave, Bala Cynwyd, PA 19004	This session we will meet at the Laurel Hill Gate House. We will provide an overview of the course and students will be introduced to the course site projects and site representatives. Review of historic masonry building technology and masonry deterioration mechanisms.
Required Reading	IET. n.d. "A Guide to Technical Report Writing." https://www.theiet.org/media/5182/technical-report-writing.pdf. Torraca, Giorgio. 2009. *Lectures on Material Science for Architectural Conservation*. Los Angeles, CA: The Getty Institute. **Pages 81-95** Friedman, D. 2020. *The Structure of Skyscrapers in America 1871-1900: Their History and Preservation*. Albany, NJ: Mount Ida Press. **Pages 47-50** DiDomizioi, Danielle, Amarantha Quintana-Morales, and Matthew Normandeau. 2025. *Early Veneer Walls: A Learning Step in the Evolution from Mass Masonry to Cavity Walls*. Ottawa, Canada: 15th Canadian Masonry Symposium.
Class 2 (9/3)	**Review of Brick & Terra Cotta Masonry Materials & Conditions** Instructors: **Roy Ingraffia**
Location: Architectural Conservation Lab Duhring Wing 051	This session will offer a review and more in-depth discussion on brick masonry materials and conditions. Case studies will be offered for conservation context. Hand samples will be reviewed.
Required Reading	Weaver, Martin E, and Frank G Matero. 1993. *Conserving Buildings*. New York, NY: John Wiley & Sons. **Pages 99-107** Jester, Thomas C., ed. 2014. *Twentieth-Century Building Materials: History and Conservation*. Los Angeles, CA: Getty Conservation Institute.**http://hdl.handle.net/10020/gci_pubs_20th_cent_building_materials. Pages 119-130**
Deadline (9/9)	Site Project Submission #SP1: Archival Research & Material Characterization
Class 3 (9/10)	**Review of Stone Masonry Material & Material Conditions** Instructors: Casey Weisdock & **Roy Ingraffia**
Location: Architectural Conservation Lab Duhring Wing 051	This session will provide an overview of natural stone materials along with conditions and stone conservation case studies. Case studies will be offered for conservation context. Hand samples and unique conditions will be reviewed.

Required Reading	McKee, Harley J. (1973) 2017. *Masonry: Stone, Brick, Mortar, and Plaster*. 2nd ed. Albany, NY: Mount Ida Press. **Pages 9-21, 31-32** Doehne, E. and Price, C. 2010. *Stone Conservation: An Overview of Current Research*. Los Angeles, CA: Getty Conservation Institute. http://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/stoneconservation.pdf **Pages 9-26**
Class 4 (9/17)	**Mortar Material Properties & Formulations** Instructor: Roy Ingraffia & **Casey Weisdock**
Location: Architectural Conservation Lab Duhring Wing 051	This session will provide a brief review of mortar materials and technology timeline as well as an in-depth discussion of contemporary mortar materials and formulations. Specific attention will be paid to the role of mortar within wall assemblies.
Required Reading	Young, D. 2021. *Mortars: Materials, Mixes and Methods, A guide to repointing mortar joints in older buildings*. Heritage Council of Victoria, Heritage Council of New South Wales, Heritage South Australia, Heritage Council of Western Australia, Tasmanian Heritage Council and Queensland Heritage Council. **Pages 35-45, 60-69** Walsh, John J. 2005. *Petrography: Distinguishing Natural Cement from Other Binders In Historical Masonry Construction Using Forensic Microscopy Techniques*. ASTM International, 4(1). http://www.highbridgematerials.com/wp-content/uploads/2011/03/Walsh-ASTM-Petrography-Natural-Cement.pdf
Deadline (9/23)	Site Project Submission #SP2: Drawing Set w/ Orthorectified Photography
Class 5 (9/24)	**Masonry System Conditions, Project Site Working Session** Instructor: **Casey Weisdock** & Roy Ingraffia
Location: West Laurel Hill Cemetery – Conservatory 225 Belmont Ave, Bala Cynwyd, PA 19004	All masonry materials experience similar deterioration phenomenon and either due to inherent characteristics, environmental factors or secondary materials within the wall assembly. This session will provide an overview of these types of general and specific conditions and ways in which deterioration in particular can affect building performance as a whole. Time will be spent reviewing deterioration phenomenon.
Required Reading	Torraca, Giorgio. 2009. *Lectures on Material Science for Architectural Conservation*. Los Angeles, CA: The Getty Institute. **Pages 72-81**
Recorded Lecture – Field & Lab Analysis, Masonry System Conditions	Students are required to view a recorded sessions that showcase both field and laboratory analysis techniques and instrumentation. This session will focus on effective methodologies for assessment and repair of masonry facades. Through project case studies, the presenters demonstrate best practices for a successful approach to masonry repair, emphasizing the implementation of a project methodology that establishes general parameters for the project in the investigation and design phases that are refined during

	construction.
Required Reading	Doehne, E. and Price, C. 2010. *Stone Conservation: An Overview of Current Research*. Los Angeles, CA: Getty Conservation Institute. http://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/stoneconservation.pdf **Pages 2-9**
Deadline – Quiz #1 (9/30)	After viewing the above recording, students will be required to complete and submit the quiz to the course instructors no later than 5 pm on Tuesday 10/1.
Class 6 (10/1)	**Project Site Working Session** Identification and Documentation of Conditions Instructor: Roy Ingraffia & **Casey Weisdock**
Location: West Laurel Hill Cemetery – Conservatory 225 Belmont Ave, Bala Cynwyd, PA 19004	This will be an onsite class to allow each student group to further identify and document conditions. Instructors will be available to meet with each group at their individual site to assist in the process. This will also be your opportunity to retrieve mortar samples for SP4.
Class 7 (10/8)	**Mid-Term Project Presentations** Instructors: Casey Weisdock & Roy Ingraffia
Location: MEY B6	Students will offer a brief overview of the site history, materials, material properties, and conditions. Feedback will be provided by the instructor, fellow students, and invited guests to be incorporated into the final report.
Class 8 (10/15)	**Masonry Cleaning** Instructor: **Roy Ingraffia**
Location: Architectural Conservation Lab Duhring Wing 051	This session presents the rationale and methodology for addressing cleaning of masonry substrates in both interior and exterior applications. Understanding how to approach and develop a proper testing program is the first step in determining which technique will clean the masonry while promoting long-term performance. This session will introduce current cleaning systems and describe their general performance and applications. Specific attention will be paid to chemical, micro-abrasive, and laser systems. Students will begin TA #1 - Masonry Cleaning Assignment.
Required Reading	Normandin, K., Weiss, N., & Slaton, D. 2005. *Cleaning Techniques in Conservation Practice*. New York, NY: Routledge. **Pages 7-28**
Deadline (10/21)	Site Project Submission #SP3: 50% Draft w/ Condition Survey Drawing Set & Conditions Glossary
Class 9 (10/22)	**Mechanical Pinning, Grouting, Below-Grade Waterproofing** Instructor: **Casey Weisdock** & Roy Ingraffia

Location: Architectural Conservation Lab Duhring Wing 051	In many instances historic masonry walls or materials require redesign or reinforcing to either stabilize or strengthen the materials or systems. This session will outline some of the most common scenarios and present a variety of current methods available to address the causes as well as the symptoms. Particular attention will be paid to pinning, grouting, & crack repair systems which have been designed for structural and non-structural applications
Required Reading	Forsyth, M. 2014. *Structures and Construction in Historic Building Conservation*. Chichester, U.K.: John Wiley & Sons. **Pages 82-86, 100-105, 142-150**
Laser Cleaning Workshop 10/24 – Friday 9am – 4pm Center for Architectural Conservation (am) Architectural Conservation Lab (pm)	Laser Ablation Guest Instructor: Adam Jenkins
Deadline (10/28)	Site Project Submission #SP4 Prioritized Conditions Report
Class 10 (10/29)	**Unit Repairs, Composite Repairs, Repointing Techniques.** Instructor: Casey Weisdock **& Roy Ingraffia**
Location: Architectural Conservation Lab Duhring Wing 051	Given the similarity of materials, proprietary and custom composite repair materials will be discussed as well as aesthetic matching. Mixing, application, protection, and curing methods will be introduced. Introduction to Treatment Assignment TA#2: Mortar Formulation
Required Reading	Young, D. 2021. *Mortars: Materials, Mixes and Methods, A guide to repointing mortar joints in older buildings*. Heritage Council of Victoria, Heritage Council of New South Wales, Heritage South Australia, Heritage Council of Western Australia, Tasmanian Heritage Council and Queensland Heritage Council. **Pages 117-119** Odgers, D., & Henry, A. 2012. *Practical Building Conservation: Stone*. New York, NY: Ashgate Publishing, Ltd. **Pages 241-252** Henry, A., McCaig, I., Willett, C., Godfraind, S., & Stewart, J. 2012. *Practical Building Conservation: Earth, Brick and Terracotta*. Burlington, VT: Ashgate Publishing Ltd. **Pages 756-761, 766-771**
Class 11 – Hands-on Workshop (11/05)	**Mortar Removal, Mortar Mixing, Repointing, Traditional Bricklaying, & Composite Repairs** Instructor: **Casey Weisdock** & Roy Ingraffia
Location: IMI/BAC Training Center, 2704 Black Lake Pl, Philadelphia, PA 19154	This session is designed to provide the participants with practical experience in mortar removal, mortar mixing, repointing, traditional bricklaying, & composite repairs.

Note: Training center is the building located to the left on the cul-de-sac	
Deadline (11/11)	Treatment Assignment #TA1: Masonry Cleaning
Class 12 – Recorded Class (11/12)	**Masonry System Repairs, Moisture Management, & Thermal Upgrades**
	This session will focus on the necessary repairs moisture management such as flashing to address critical conditions and/or design flaws. Additional information will be provided on considerations for attempting thermal upgrades to historic masonry structures.
Required Reading	*Technical Bulletin 14: Through-Wall Flashing*. The Sealant, Waterproofing & Restoration Institute. https://www.swrionline.org/files/14-19_SWRI_TechBulletin14_ThroughWallFlashing.pdf Straube, John. *BSD-114: Interior Insulation Retrofits of Load-Bearing Masonry Walls in Cold Climates*. Buildingscience.com. March 28, 2007. https://buildingscience.com/documents/digests/bsd-114-interior-insulation-retrofits-of-load-bearing-masonry-walls-in-cold-climates.
Deadline – Quiz #2 (11/18)	After viewing the above recording, students will be required to complete and submit the quiz to the course instructors no later than 5 pm on Tuesday 11/19.
Deadline (11/18)	Treatment Assignment TA#2: Mortar Formulation
Class 13 (11/19)	**Masonry Coatings & Surface Treatments** Instructor: **Casey Weisdock** & Roy Ingraffia
Location: Architectural Conservation Lab Duhring Wing 051	There are any number of traditional and contemporary coatings that can be used to address performance and aesthetic issues surrounding historic and existing masonry structures. These products range anywhere from hydrophobic coatings used to minimize water infiltration, to consolidants used to strengthen the surface of weathered masonry; brick, terra cotta, & natural stone. This session will introduce general types of coatings, their properties/chemical composition, methods of application, and performance. Particular attention will be paid to the processes which cause conditions that may warrant the use of a surface coating as well as when these types of products should and should not be used.
Required Reading	Stutzman, David. 2012. *Tech Tips: Water Vapor Transmission*. 2012.

	Conspectus 12. Odgers, D., & Henry, A. 2012. *Practical Building Conservation: Stone*. New York, NY: Ashgate Publishing, Ltd. **Pages 225-260** Hawk, Jonas and Wei Lam. 2007. *A House of Brick: Water Repellents and Elastomeric Coatings*. Interface, August. https://iibec.org/wp-content/uploads/2007-08-lam-hawk.pdf.
Deadline (12/2)	Site Project Submission #SP5: Draft Testing Program & Treatment Recommendations
Class 14 (12/3)	**Final Site Project Presentations** Instructors: Casey Weisdock & Roy Ingraffia
Location: MEY B6	Students will offer a brief overview of the site history and conditions as well as on the treatment recommendations and testing program that has been developed. Feedback will be provided by the instructor, fellow students, and invited guests to be incorporated into the final report.
Deadline (12/09)	Site Project Submission #SP6: 100% Draft Reports (These documents will be reviewed and returned by 12/15 with suggestions and comments which should be incorporate into your Final Reports).
Deadline (12/16)	Site Project Submission #SP7: 100% Final Reports

Textbooks:

There are no mandatory books for you to purchase for this course however, the reserved books listed below will be primary resources for the course and invaluable in your careers.

Reserved Reference (Fisher Fine Arts):

- Henry, Alison. Stone Conservation, Principles and Practice. Dorset: Donhead, 2006.
- Henry, Alison, and John D Stewart. Earth, Brick & Terracotta. Practical Building Conservation. Farnham: Ashgate Publishing, 2012
- Henry, Alison, and John D Stewart. Mortars, Renders & Plasters. Practical Building Conservation. Farnham: Ashgate Publishing, 2012
- Odgers, David, and Catherine Croft. Concrete. Practical Building Conservation. Farnham: Ashgate Publishing, 2012
- Odgers, David, and Alison Henry. Stone. Practical Building Conservation. Farnham: Ashgate, 2012.
- Siegesmund, Siegfried, and Rolf Snethlage. "Stone in Architecture: Properties, Durability". Springer 2014

Digital Reference:

Websites:

Pennsylvania Department of Conservation and Natural Resources
Bureau of Topographic and Geological Survey
http://www.denr.state.pa.us/denr/deputate/topogeo/default.htm

Geological Society of America
http://www.geosociety.org/

Natural Stone Home Page for the Stone Industry
http://www.natural-stone.com/

Mineralogy and Petrology Research on the Web
http://www.udayton.edu/%7Egeology/resminpet.html

US Geological Survey-Geological Information
http://geology.usgs.gov/

Building Stone of the United States: the NIST Test Wall
http://stonewall.nist.gov/

Stone Quarries and Beyond
http://www.cagenweb.com/quarries/index.html

A Glossary of Historic Masonry Deterioration Problems and Preservation Treatments:

https://npshistory.com/publications/preservation/masonry-glossary.pdf

Publications:

- Doehne, Eric. and Price, Clifford. Stone Conservation, An Overview of Current Research. Los Angeles: Getty Conservation Institute, 2010.

  http://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/stoneconservation.pdf

- Twentieth-Century Building Materials: History and Conservation
  https://www.getty.edu/conservation/publications_resources/books/20th_cent_building_materials.html

- ICOMOS-ISCS :Illustrated glossary on stone deterioration patterns:

  http://www.icomos.org/publications/monuments_and_sites/15/pdf/Monuments_and_Sites_15_ISCS_Glossary_Stone.pdf

- NYC Buildings – FAÇADE CONDITIONS: An Illustrated Glossary of Visual Symptoms

  https://www1.nyc.gov/assets/buildings/images/content/misc/FacadePresentation.pdf

Bibliography:

A fairly comprehensive masonry bibliography will also be provided at the beginning of the course.

PROJECT SITES

WEST LAUREL HILL CEMETERY
215 Belmont Ave, Bala Cynwyd, PA 19004
Phone #: 610-668-9900

Site Access:
Site Manger: Bill Doran (pjd@forever-care.com)
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