SUSTAINABLE DESIGN REVIEW COMMITTEE

500 W. Big Beaver
Troy, MI 48084
(248) 524-3364
www.troymi.gov
planning@troymi.gov

MEETING AGENDA

Committee Members: Building Official, City Engineer
Planning Commissioners (2), Zoning Administrator

January 25, 2017 **2:00 P.M.** **Conference Room C**

1. ROLL CALL

2. APPROVAL OF MINUTES – November 17, 2016

3. BUSINESS AGENDA

   A. Air Liquide, located on east side of Combermere, south of Maple (1290 Combermere), Section 34 – Zoned IB Integrated Industrial and Business Zoning District

   - Seeking SDP status to park in front yard in IB

   B. 1-800-Self Storage, located on east side of Coolidge, south of Maple (1330 Coolidge), Section 32 – Zoned MR Maple Road Zoning District

   - Seeking SDP status to exceed maximum lot coverage

4. OTHER BUSINESS

ADJOURN

NOTICE: *People with disabilities needing accommodations for effective participation in this meeting should contact the City Clerk by e-mail at clerk@troymi.gov or by calling (248) 524-3317 at least two working days in advance of the meeting. An attempt will be made to make reasonable accommodations.*

R. Brent Savidant called the meeting of the Sustainable Design Review Committee to order at 3:02 p.m. on November 17, 2016 in Conference Room C of Troy City Hall.

1. ROLL CALL

Present:
Michael W. Hutson, Planning Commission Representative
Don Edmunds, Planning Commission Representative
Antonio Cicchetti, Civil Engineer (acting as the City Engineer)
Mitch Grusnick, Building Official
R. Brent Savidant, Planning Director (acting as the Zoning Administrator)

Also Present:
Rachel Smith, PEA (representing applicant)
Roy Baker, NSA (representing applicant)

2. APPROVAL OF MINUTES

Resolution # SDRC-2016-03-003
Moved by: Edmunds
Seconded by: Hutson

RESOLVED, To approve the minutes of the March 10, 2016 Sustainable Design Review Committee, as printed.

Yes: All present (5)

MOTION CARRIED

3. BUSINESS AGENDA

A. Regency at Troy, located on southeast corner of Maple Road and Axtell (2785 W. Maple), Section 32 – Zoned IB

- **Seeking SDP status to park in front yard in IB**

Chairman Savidant summarized the application. Sustainable features added include rain gardens and bioswales planted with drought-tolerant native plant species and four (4) vehicle charging stations.

The applicant presented a Maintenance Plan to assist with maintenance of the bioswale moving forward. Mr. Hutson suggested the Maintenance Plan was lacking details and suggested that Staff share the Maintenance Plan from the previous Discount Tire application with the applicant.

The Committee discussed Axtell on-street parking and had no objections, provided it was reviewed and approved by the Engineering Department as part of Preliminary Site Plan Approval.

Resolution # SDRC-2016-03-004
Moved by: Grusnick
Seconded by: Hutson

RESOLVED, The SDRC hereby grants Prequalified SDP status, subject to the following:

- Applicant shall consider planting higher profile plants in the bioswales and rain gardens to assist in shielding headlight glare.
- Applicant shall submit enhanced Maintenance Plan to Engineering Department for review and approval prior to Final Site Plan Approval.
- Approval includes front yard parking between the building and both Maple and Axtell, as proposed.

Yes: All present (5)

MOTION CARRIED

4. OTHER BUSINESS

There was no one present who wished to speak.

ADJOURN

The meeting of the Sustainable Design Review Committee adjourned at 3:30 p.m.

Respectfully submitted,

R. Brent Savidant, Planning Director

G:\Sustainable Development Option\SDRC Meetings\Minutes\Draft\11-17-16 SDRC Meeting_Draft.doc

DATE: January 10, 2017

TO: Sustainable Design Review Committee

FROM: R. Brent Savidant, Planning Director

SUBJECT: PREQUALIFIED SDP STATUS – Air Liquide, located on east side of Combermere, south of Maple (1290 Combermere), Section 34 – Zoned IB

The petitioner, Scott Monchnik & Associates, Inc submitted the above referenced application for Prequalified SDP Status for parking in the front yard in the IB Integrated and Industrial Zoning District. The parking is required for additional parking for the existing Air Liquide facility. This use needs only administrative Preliminary Site Plan Approval once it received Prequalified SDP Status from the Sustainable Design Review Committee.

The applicant proposes a number of sustainable design features, which are listed on Sheet L1.00. These sustainable features include:

PREREQUISITES

1. Stormwater Quality – Bioswale and rain garden in front yard
2. Stormwater Quantity – Bioswale and rain garden in front yard
3. Light Pollution – Existing site lighting will be placed on a timer for non-emergency lighting. Timer will turn half of existing wall pack light fixtures off from 11pm to 5am. Existing wall pack light fixtures to have full cutoff shielding installed.

QUALIFYING

1. Transportation: Commuter – Add a bicycle rack to accommodate employees who wish to bike to work.
2. Water Resources: Water Efficient Landscaping – Will provide landscaping which will effectively process water in the most efficient manner possible, reducing negative effects of poor stormwater management.

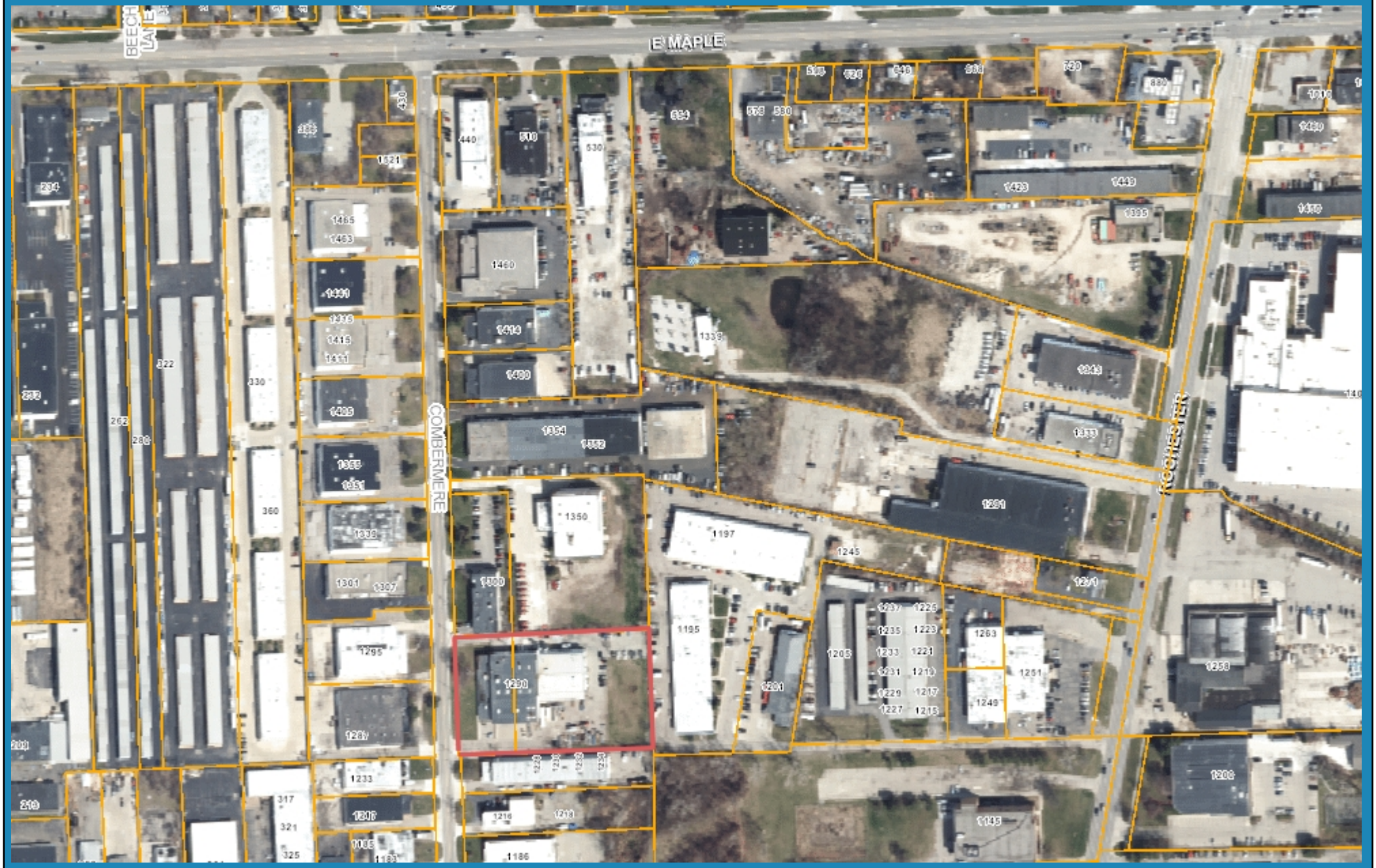
The applicant meets the three Prerequisite Measures and two Qualifying measure for parking in a front yard in the IB district. Prequalified SDP status is recommended, subject to:

1. Provide Maintenance.

Attachments:

1. Maps
2. Site plan

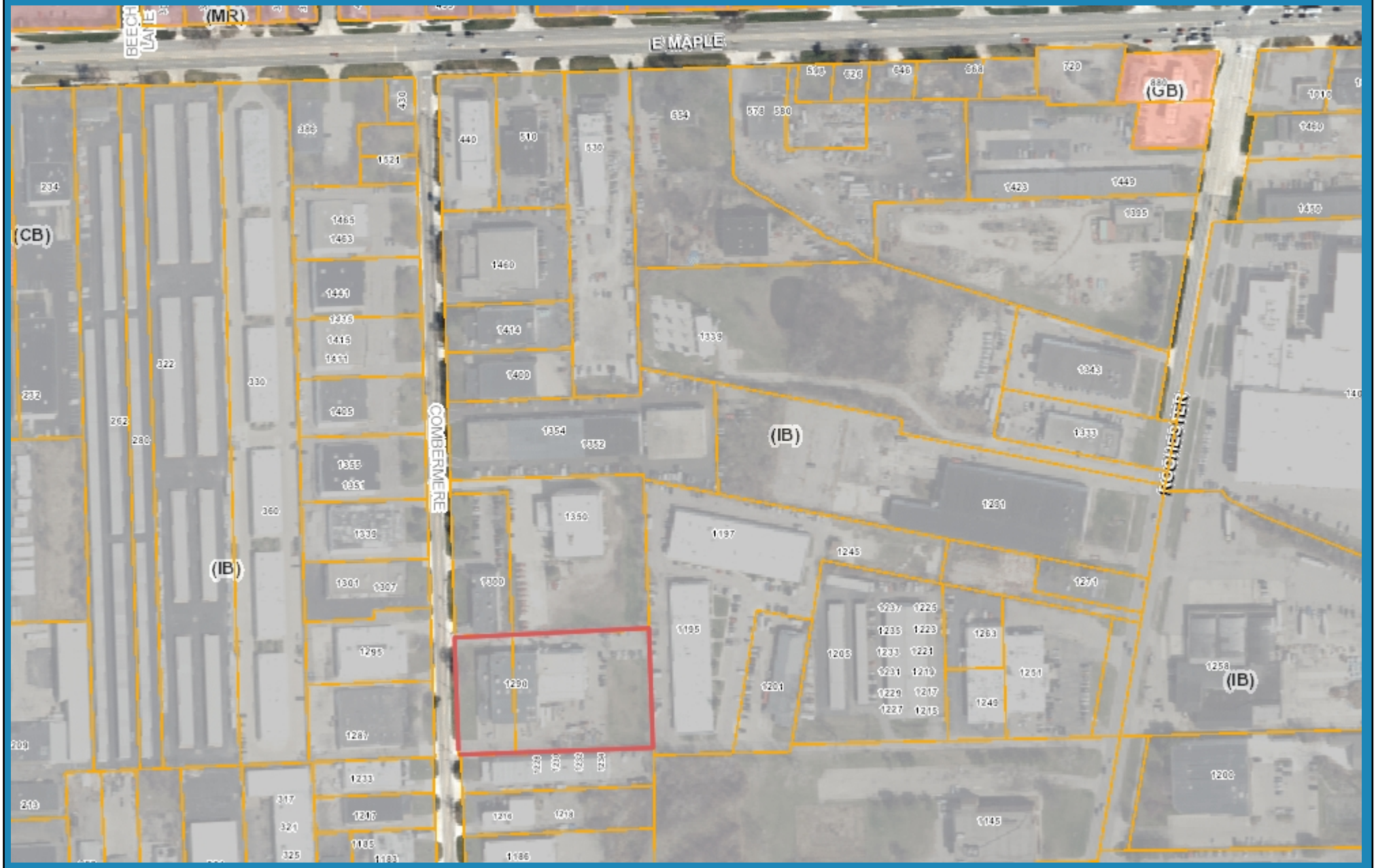
City of Troy GIS Online



752 0 376 752 Feet

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

City of Troy GIS Online



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AIR LIQUIDE

TROY, MICHIGAN

LOCATION MAP
NO SCALE

OWNER:
AIRGAS USA, LLC
2009 BELLAIRE
ROYAL OAK, MI 48067

JEFF MARACANI
734.849.7656

MEP ENGINEER:
EAM ENGINEERING, INC
4101 JOHN R ROAD, SUITE 200
TROY, MI 48085

RICHARD TRUDELLE, P.E. LEED AP
248-528-2670

BUILDER:
CONTRACTING SERVICES OF MICHIGAN
33734 JAMES J. POMPO
FRASER, MI 48026

PETE FIORINO
586.822.4445

STRUCTURE ENGINEER:
DESI / NASR
6765 DAILY
WEST BLOOMFIELD, MICHIGAN

MARC STEINHOBEL
248-932-2010

LIST OF DRAWINGS

- ● NEW SHEET
- ◑ EXISTING SHEET CHANGED
- ○ NO CHANGE

		16 DEC 16	SUSTAINABLE DEVELOPMENT
COVER SHEET	G1.00	●	
SITE PLAN	L1.00	●	
LANDSCAPE PLAN	L1.01	●	
LANDSCAPE SECTIONS & DETAILS	L1.02	●	
CIVIL ENGINEERING SITE PLAN	C-3	●	

ARCHITECTS
PLANNERS
INTERIOR DESIGN

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& ASSOCIATES, INC.
1700 STUTZ DRIVE
SUITE 104-B
TROY, MICHIGAN
48084
TEL: 248-654-1010
FAX: 248-654-3002
SCOTT@SMAARCH.COM

AIR LIQUIDE
1290 COMBERMERE DR.
TROY, MICHIGAN 48083

ISSUED FOR:
16 DEC 16
SUSTAINABLE
DEVELOPMENT SET

SHEET# A0.01
DATE: 16 DEC 16
JOB# 16081SDP

PROPOSED SUSTIANABLE DESIGN MEASURES

SECTION	PREREQUISITES
A	STORMWATER: QUALITY - BIOSWALE AND RAIN GARDEN
A	STORMWATER: QUANITY - BIOSWALE AND RAIN GARDEN
D	LIGHT POLLUTION -THE EXISTING SITE LIGHTING WILL BE PLACED ON A TIMER FOR ALL NON-EMERGENCY LIGHTING. TIMER WILL TURN HALF OF THE EXISTING WALL PACK LIGHT FIXTURES OFF FROM 11pm TO 5am. ALL EXISTING WALL PACK LIGHT FIXTURES WILL HAVE FULL CUTOFF SHIELDING INSTALLED, TO PREVENT LIGHT TRESPASS.

SECTION	QUALIFYING
C	TRANSPORTATION: COMMUTER - ADD A BICYCLE RACK, TO ACCOMODATE EMPLOYEES WHO WISH TO BIKE TO WORK.
F	WATER RESOURCES: WATER EFFICIENT LANDSCAPING -WE WILL BE PROVIDING LANDSCAPING WHICH WILL EFFECTIVELY PROCESS WATER IN THE MOST EFFICIENT MANNER POSSIBLE, REDUCING NEGATIVE EFFECTS OF POOR STORMWATER MANAGEMENT

LAND - BUILDING - PARKING DATA

LAND AREA: +/-282,321 SQ. FT. GROSS = +/-6.48 ACRES

BUILDING AREA
EXISTING BUILDING: TOTAL 22,920 SF

PARKING DATA

PARKING REQUIRED
LIGHT INDUSTRIAL: 22,920 SF / 550 = 41.67 = 42 SPACES REQ'D

TOTAL PARKING REQUIRED	42 SPACES
PROVIDED PARKING	
TOTAL PARKING PROVIDED	46 SPACES (INCLUDES 2 BF SPACES)
EMPLOYEE COUNT	
TOTAL EMPLOYEES	24 PERSONS

LEGAL DESCRIPTION:

LAND SITUATED IN THE CITY OF TROY, COUNTY OF OAKLAND, STATE OF MICHIGAN, DESCRIBED AS FOLLOWS:

PARCEL 1:
LOTS 23, 24, 25 AND 26, ALSO VACATED PART OF FURBROOK AVENUE ADJACENT TO LOT 26, BEECH HILL SUBDIVISION, AS RECOREDED IN LIBER 15, PAGE 32 OF PLATS, OAKLAND COUNTY RECORDS.

PARCEL 2:
PART OF NORTHWEST 1/4 OF SECTION 34, TOWN 2 NORTH, RANGE 11 EAST, CITY OF TROY, OAKLAND COUNTY, MICHIGAN, BEGINNING AT POINT DISTANCT SOUTH 89 DEGREES 51 MINUTES 00 SECONDS WEST 0.15 FEET AND SOUTH 00 DEGREES 12 MINUTES 00 SECONDS EAST 1244.35 FEET FROM NORTH1/4 CORNER; THENCE SOUTH 00 DEGREES 12 MINUTES 00 SECONDS EAST 249.76 FEET, THENCE SOUTH 89 DEGREES 10 MINUTES 01 SECONDS WEST 293.02 FEET, THENCE NORTH 00 DEGREES 12 MINUTES 00 SECONDS WEST 253.00 FEET, THENCE NORTH 89 DEGREES 48 MINUTES 00 SECONDS EAST 293.02 FEET TO BEGINNING.

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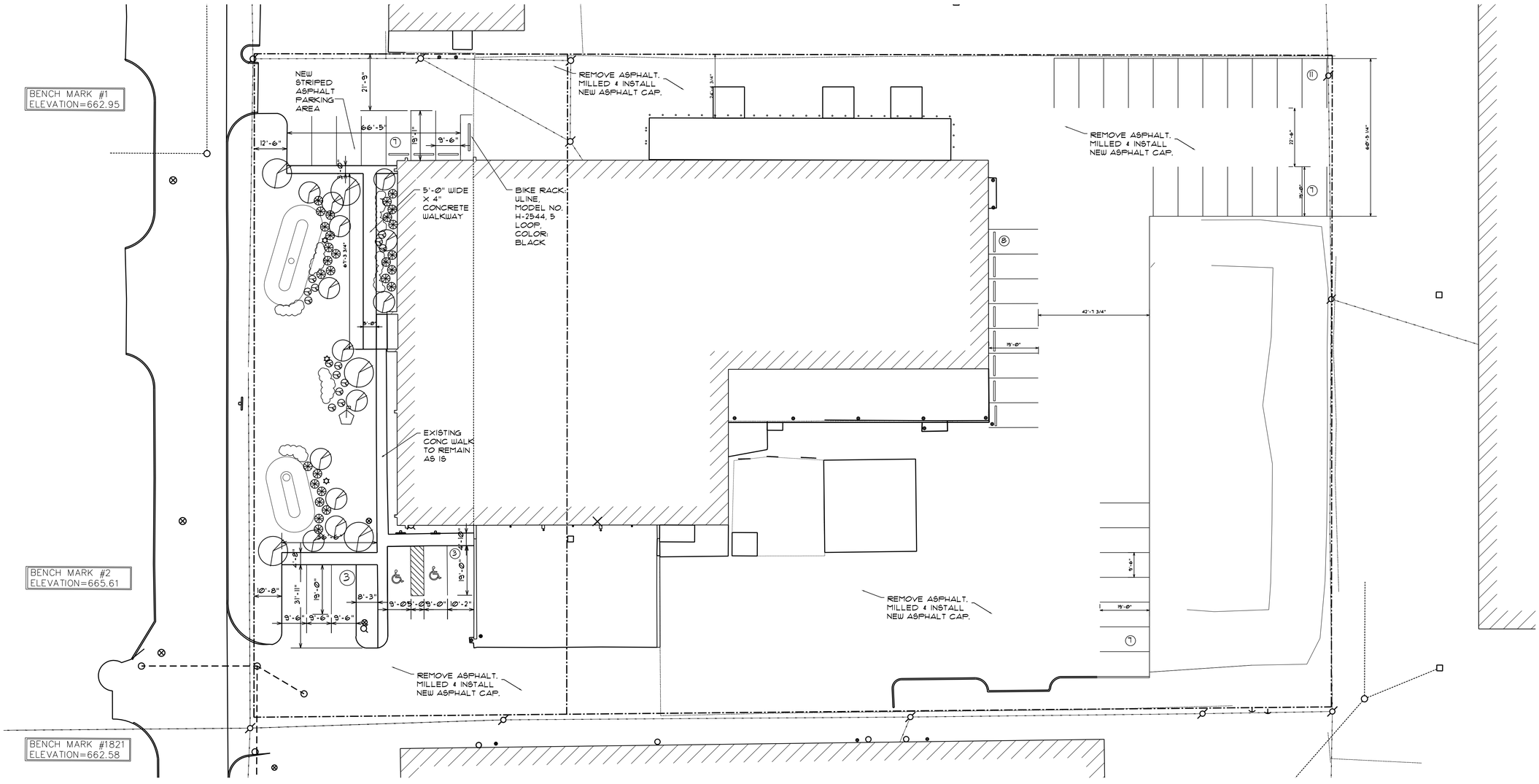

NORTH

SITE PLAN
PROPOSED FRONT YARD PARKING

1" = 20'-0"

AIR LIQUIDE
1290 COMBERMERE DR.
TROY, MICHIGAN 48083

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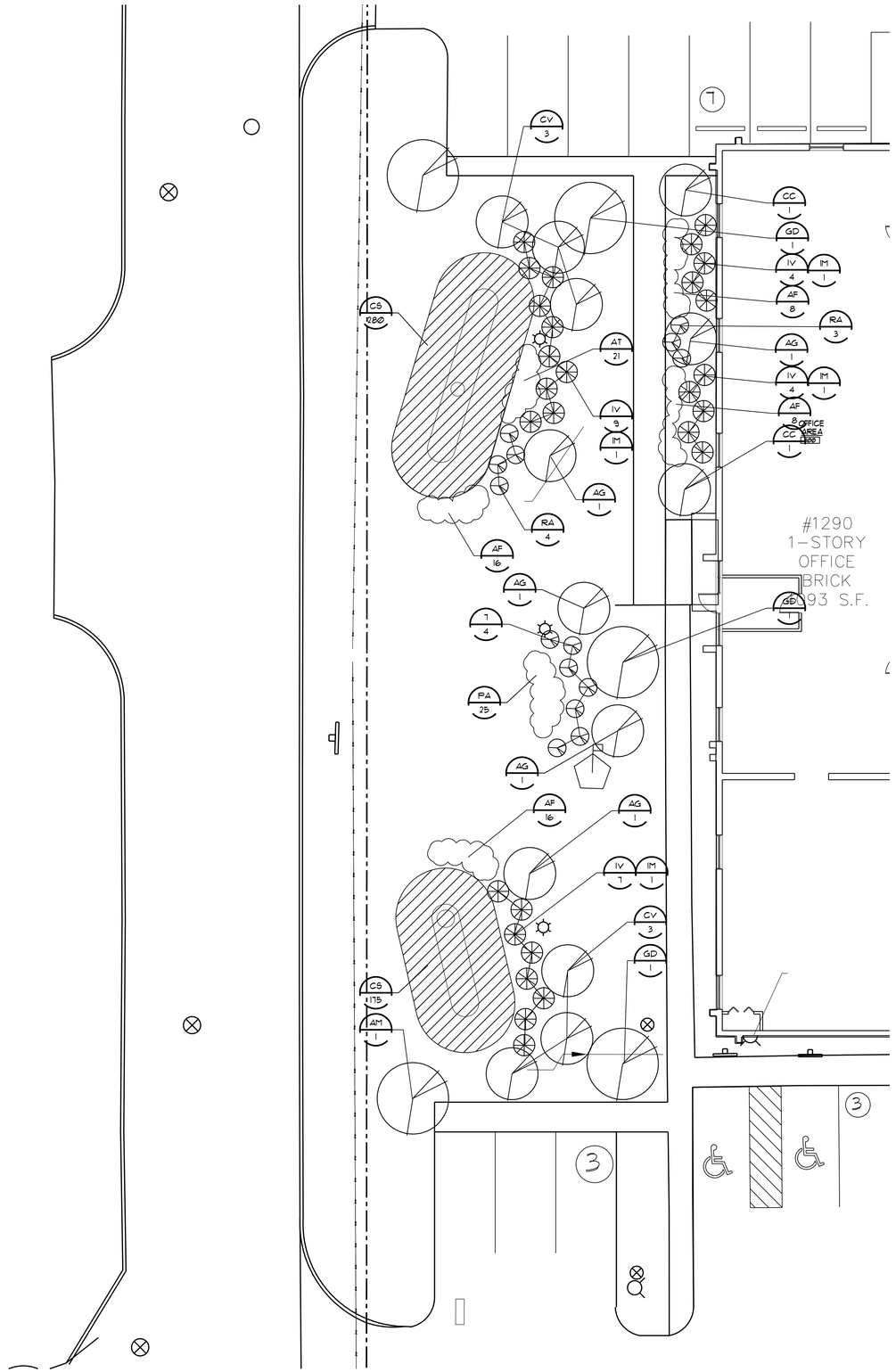

PLANT SPECIFICATIONS

Type	Code	Common Name	Botanical Name	Size	Specification
AG	5	Autumn Brillance Serviceberry	Amelanchier x grandiflora 'Autumn Brillance	7' clump	B&B
AM	2	Amur Maple	Acer ginnala	6' clump	SpecimenB&B
CC	2	Appalachian Red Redbud	Cercis canadensis 'Appalachian Red'	1 1/2" cal.	B&B
CV	6	Winter King Hawthorn	Crataegus virdis 'Winter King'	1 1/2" cal	B&B
GD	3	Espresso Kentucky Coffeetree	Gymnociadus diocus 'Espresso'	2 1/2" cal	B&B
IV	24	Berry Poppins Winterberry	Ilex vericillata 'Berry Poppins'	#3cont	
IM	4	Mr. Poppins Winterberry	Ilex vericillata 'Mr Poppins'	#3cont	
RA	14	Gro-Low Frangant Sumac	Rhus aromatica 'Gro-Low'	#3cont	
AT	21	Butterfly Weed	Asclepias tuberosa	#1cont	
AF	48	Monch Hybrid Aster	Aster x frikartii 'Monch'	#1cont	
CV	455	Brown Fox Sedge	Carex vulpinoidea	plug	38celltray
PA	25	Hamein Dwarf Fountain Grass	Pennisetum alopecuroides 'Hameln'	#1cont	

NORTH

NEW WORK LANDSCAPE PLAN

SCALE = 1:30

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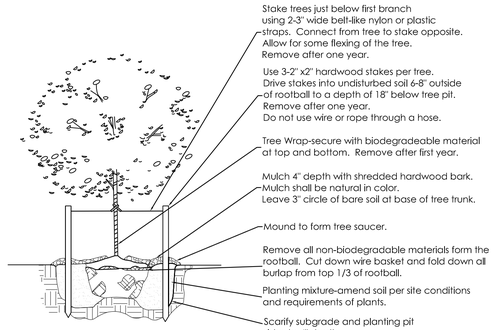
LANDSCAPE NOTES

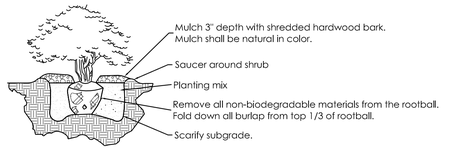
1. ALL PLANTS TO BE INSTALLED IN ACCORDANCE WITH AMERICAN ASSOCIATION OF NURSERYMEN LANDSCAPE STANDARDS.
2. CONTRACTOR SHALL PROVIDE A PLANTING MIXTURE MEETING THE FOLLOWING REQUIREMENTS. IF THE ENGINEER HAS ANY CONCERNS WITH THE QUALITY OF THE PLANTING MIXTURE, THE ENGINEER SHALL BE ALLOWED TWO WEEKS TO OBTAIN SOIL TEST TO DETERMINE SPECIFICATION COMPLIANCE. NO PLANT MATERIAL SHALL BE PLANTED PRIOR TO ENGINEER APPROVAL OF PLANTING MIXTURE. ALL PLANT MATERIAL SHALL BE MAINTAINED BY THE CONTRACTOR IN A VIGOROUS GROWING CONDITION DURING THIS TIME AT NO ADDITIONAL COST.
3. SPACING OF PLANT MATERIALS SHALL BE AS SHOWN ON DRAWING OR ON PLANT LIST. THE ENGINEER SHALL REVIEW THE PLACEMENT OF PLANT MATERIAL PRIOR TO AND AFTER INSTALLATION, AND RESERVES THE RIGHT TO ADJUST LAYOUT TO ACCOMMODATE SITE CONDITIONS AND DESIGN INTENT.
4. ALL PLANT MATERIALS SHALL CONFORM TO PLANT SCHEDULES. SIZES SHALL BE MINIMUM STATED ON THE PLANT LIST OR LARGER. ALL MEASUREMENTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE "A.A.N. STANDARDS FOR NURSERY STOCK."
5. NO PLANT SHALL BE PUT INTO THE GROUND BEFORE ROUGH GRADING HAS BEEN FINISHED AND REVIEWED BY THE ENGINEER REVIEW.
6. FINAL PLANT LOCATIONS SHALL BE MARKED BY CONTRACTOR THREE WORKING DAYS PRIOR TO PLANTING FOR ENGINEER REVIEW.
7. ALL PLANTED PLANTS SHALL BER THE SMAE RELATIONSHIP TO FINISHED GRADE AS THE PLANTS ORIGINAL GRADE BEFORE DIGGING.
8. PLANT MATERIAL, ESPECIALLY EVERGREENS, TO BE PLANTED HIGHER THAN NORMAL WHEN HEAVY SOIL CONDITIONS (CLAY, ETC.)PREVAIL.
9. IF FOR ANY REASON ANY BALLED AND BURLAPED PLANT MATERIALS NEED TO BE STORED ON SITE LONGER THAN A 24-HOUR PERIOD, THEIR ROOT BALLS SHALL BE PROTECTED. ALL PLANTS SHALL BE THOROUGHLY WATERED EACH DAY THEY ARE STORED ON SITE. PLANTS MAY BE STORED ON SITE FOR A MAXIMUM OF TWO (2) WEEKS, OR 14 DAYS. ANY PLANTS ALLOWED TO DRY OUT AS DETERMINED BY THE ENGINEER WILL BE REJECTED.
10. NO CONTAINER GROWN STOCK WILL BE ACCEPTED IF IT IS ROOT BOUND. ALL WRAPPING MADE OF SYNTHETIC OR PLASTIC SHALL BE COMPLETELY REMOVED AT THE TIME OF PLANTING.
11. THE CONTRACTOR SHALL FILL PLANT PIT WITH PREPARED PLANT MIX TO 1/2 DEPTH OF ROOT BALL OR ROOT MASS. PACK FIRMLY, PUDDLE WITH WATER, THEN FOR BALLED AND BURLAPED MATERIAL, THE BURLAP AND ALL LACING (INCLUDING WIRE BASKET IF NECESSARY) SHALL BE REMOVED FROM THE UPPER 1/3 OF ROOT BALL, THEN FINISH BACK FILLING ADDING SOLID FERTILIZER TO THE PLANT MIX, PACK FIRMLY AND WATER. A SAUCER SHALL BE PLACED AROUND EVERY PLANT AND SHALL BE APPROVED PRIOR TO PLACEMENT OF ANY MULCH.
12. ALL DISTURBED LAWN AREAS SHALL BE RESTORED WITH 4-INCHES OF TOPSOIL, SPREAD, FINE GRADE, AND SEEDED AS SPECIFIED. PRIOR TO INSTALLATION OF TOPSOIL, LOOSEN SUB GRADE TOA DEPTH OF 2-INCHES. THIS WORK SHALL BE INCIDENTAL TO THE PROJECT.
13. TOPSOIL SHALL CONSIST OF FRIABLE, SHREDDED, AND SCREENED SOIL REASONABLE FREE OF GRASS, ROOTS, WEEDS, STICKS, STONES OR OTHER FOREIGN MATERIALS. THE TOPSOIL MATERIAL SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT. SOIL COMPOSITION SHOULD CONTAIN AN ORGANIC CONTENT OF 2 TO 6 PERCENT AND BE CLASSIFIED AS A LOAM OR SANDY LOAM AS SPECIFIED IN THE "GUIDE FOR U.S.D.A.SOIL TEXTURAL CLASSIFICATION".
14. ALL TREES AND SHRUBS ARE TO BE FERTILIZED ONCE ROOTS SYSTEM IS ESTABLISHED WITH AGRIFORM 21-GRAM FERTILIZER TABLETS AT RATES RECOMMENDED BY MANUFACTURER.
15. TREES SHALL BE STAKED UPON THE APPROVAL OF THE LANDSCAPE ARCHITECT. IF APPROVED, THE STAKING SHALL BE ADJUSTED AND REPAIRED AS NECESSARY AND REMOVED AT THE END OF THE ESTABLISHMENT PERIOD.
16. ALL PLANTS AND STAKES SHALL BE SET PLUMB UNLESS OTHERWISE SPECIFIED. ALL GUYS AND STAKES MUST BE LOCATED WITHIN EACH TREES MULCHED AREA TO ELIMINATE THE POSSIBILITY OF MOWER CONTACT AND TO REDUCE MAINTENANCE.
17. AT PLANTING TIME, ALL DEAD AND BROKEN BRANCHES SHALL BE PRUNED ON ALL DECIDUOUS TREES.
18. CONTRACTOR SHALL APPLY ENGINEER APPROVAL PRE-EMERGENT HERBICIDE TO SHRUB AND GROUND COVER PLANTING AREAS AT THE TIME OF PLANTING (IF SPRING PLANTED) OR THE FOLLOWING SPRING. CONTRACTOR SHALL ENSURE THE PLANT MATERIALS ARE RESISTANT TO THE HERBICIDE PROPERTIES. HERBICIDE SHALL BE APPLIED ACCORDING TO MANUFACTURERS SPECIFICATIONS AND IN ACCORDANCE WITH SOUND HORTICULTURAL PRACTICES.
19. PLANTING MIXTURE SHALL BE A MIXTURE OF 5/8 TOPSOIL, 2/8 SAND, AND 1/8 PEAT. PLANTING MIXTURE SHALL BE FREE FROM STICKS, STONES, SOD CLOTS OR OTHER MATERIAL WHICH MIGHT LEAVE POCKETS ROUND THE ROOTS.
20. ALL EVERGREEN PLANTS SHALL BE SPRAYED ACCORDING TO MANUFACTURES INSTRUCTIONS WITH AN ANTI-DESICCANT THE FIRST WINTER. THE ENGINEER SHALL BE NOTIFIED THREE DAYS PRIOR TO THIS WORK.
21. ALL TREES, SHRUBS AND PERENNIAL GROUND COVER SHALL RECEIVE A MINIMUM DEPTH OF THREE INCHES DOUBLE SHREDDED HARDWOOD BARK MULCH. WHERE PLANT BEDS MEET PAVEMENTS, LAWN, OR STEEL EDGING CUT THE GRADE TO ALLOW FOR MULCH AND THREE-INCH DROP FROM ADJOINING FINISH GRADE.
22. ALL PLANT BEDS SHALL BE EXCAVATED TO A MINIMUM DEPTH TO A MINIMUM OF 8-INCHES AND BACKFIELD WITH SPECIFIED PLANT MIX AS PER PLANTING BED DETAILS. BEDS SHALL BE EDGED WITH METAL EDGING AROUND PERIMETER AS SHOWN IN TYPICAL PERENNIAL PLANTING DETAIL. ALL EDGING SHALL BE 4-INCH WIDE - 12 GAUGE STEEL, COLOR BLACK. CONTRACTOR SHALL LAYOUT EDGING FOR APPROVAL AN D INSTALL PER PERENNIAL PLANTING BED DETAIL. STEEL EDGING SHALL NOT BE INSTALLED AROUND SINGLE TREES, CREATE NATURAL EDGE IN THOSE INSTANCES.
23. SNOW SHALL NOT BE PUSHED ONTO INTERIOR LANDSCAPE ISLANDS UNLESS DESIGNATED FOR SNOW STORAGE.
24. ALL PLANTINGS SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR. ALL DISEASED, DAMAGED, OR DEAD MATERIAL SHOWN ON THE SITE PLAN SHALL BE REPLACED AT THE END OF THE TWO (2) YEAR PERIOD.
25. APPLICATIONS OF FERTILIZER BEYOND THE INITIAL TOPSOIL AND SEEDING SHALL BE A FERTILIZER WITH NO PHOSPHOROUS.
26. CONTRACTOR SHALL NOTIFY MISS DIG (800) 482-7171 A MINIMUM OF THREE WORKING DAYS PRIOR TO BEGINNING CONSTRUCTION IN THE AREA OF THE WORK.



Notes:
1. Tree shall bear same relation to finish grade as it bore originally or slightly higher than finish grade up to 6" above grade, if directed by Landscape Architect for heavy clay soil areas.
2. Do not prune terminal leader. Prune only dead or broken branches.
3. Remove all tags, string, plastics, and other materials that are unsightly and could cause girdling.

DECIDUOUS TREE

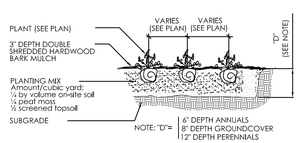
NOT TO SCALE



Notes:
1. Shrub shall bear same relation to finish grade as it bore originally or slightly higher up to 4" above grade, if directed by the Landscape Architect for heavy clay soils.
2. Prune only dead or broken branches.
3. Remove all tags, string, plastics, and other materials that are unsightly and could cause girdling.

DECIDUOUS SHRUB

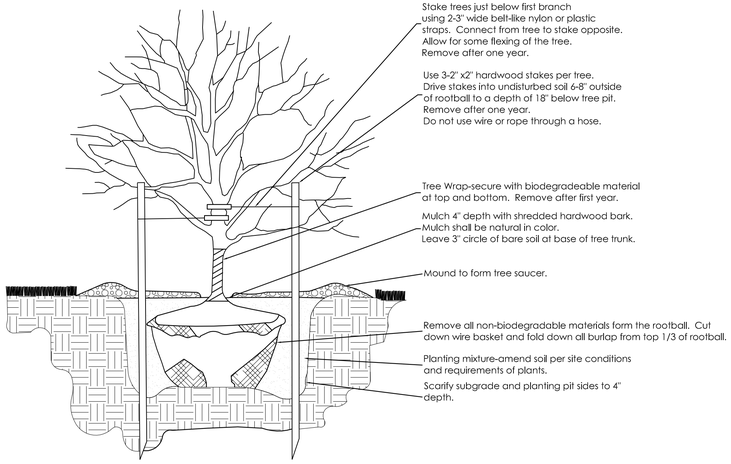
NOT TO SCALE



NOTE:
-Plant per planting plan layout
-Perennials to be planted up to saucer around tree or shrub in the area.

ANNUALS, PERRENIALS GROUND COVERS

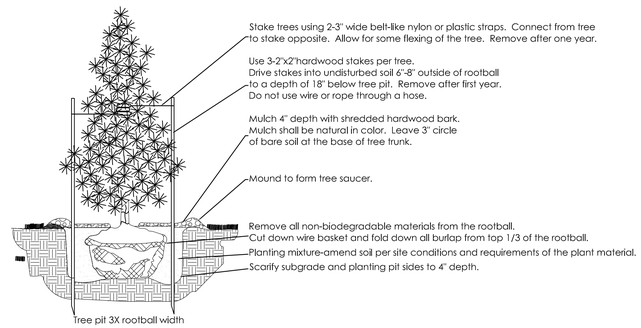
NOT TO SCALE



Notes:
1. Tree shall bear same relation to finish grade as it bore originally or slightly higher than finish grade up to 6" above grade, if directed by Landscape Architect for heavy clay soil areas.
2. Do not prune terminal leader. Prune only dead or broken branches.
3. Remove all tags, string, plastics, and other materials that are unsightly and could cause girdling.

ORNAMENTAL TREE

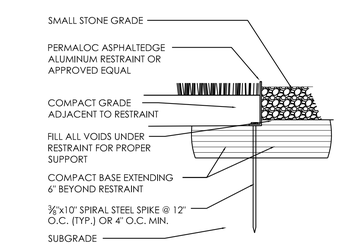
NOT TO SCALE



Notes:
1. Tree shall bear same relation to finish grade as it bore originally or slightly higher than finish grade up to 6" above grade, if directed by Landscape Architect for heavy clay soil areas.
2. Do not prune terminal leader. Prune only dead or broken branches.
3. Remove all tags, string, plastics, and other materials that are unsightly and could cause girdling.

EVERGREEN TREE

NOT TO SCALE



LANDSCAPE EDGE DETAIL

NOT TO SCALE

AIR LIQUIDE
1290 COMBERMERE DR.
TROY, MICHIGAN 48083

ISSUED FOR:
16 DEC 16
SUSTAINABLE
DEVELOPMENT SET

SHEET# L1.02
DATE: 16 DEC 16
JOB# 16081SDP

DATE: January 10, 2017

TO: Sustainable Design Review Committee

FROM: R. Brent Savidant, Planning Director

SUBJECT: PREQUALIFIED SDP STATUS – 1-800-Self Storage, located on east side of Coolidge, south of Maple (1330 Coolidge), Section 32 – Zoned MR

The petitioner, Guido Architects, Inc., Inc submitted the above referenced application for Prequalified SDP Status to exceed maximum lot coverage. A large self-storage facility is proposed for the property, which requires Special Use Approval from the Planning Commission. The plan is divided into two phases of development. Phase one is a 4-story, 34,356 square foot building Phase two is a 4-story, 29,610 square foot addition, connected to the phase one building from the second through fourth floor. There will be a covered one-way drive-through loading and unloading area located between the buildings; this will be part of phase two; the three floors above contain additional storage units. The first floor of phase one includes 52 storage units plus an office, while floors 2-4 employ 67 storage units each. The first floor of phase two includes 27 storage units, while floors 2-4 employ 66 storage units each. Once completed the total combined building envelope will be 13,880 square feet and house 478 self-storage units. Phase two will bring the site under the 20% maximum lot coverage requirement.

The Planning Commission considered this item at the July 26, 2016 Regular meeting and postponed the item “until the applicant fulfills the requirements of the Sustainable Design Committee and has a definitive response from the FAA”.

The applicant proposes a number of sustainable design features which are listed on a document submitted by Guido Architects, Inc., dated 12/1716.

PREREQUISITES

1. Stormwater Quality – 1650 SF rain garden area
2. Stormwater Quantity – 1650 SF rain garden area
3. Heat Island – Building will have a white-color Duro-Last roof membrane to reflect sunlight.
4. Water Efficient Landscaping – Water-efficient plantings proposed.

QUALIFYING

1. Redevelopment and Reuse – Eliminating obsolete industrial building
2. Light Pollution – Energy-efficient LED lighting with cut-off fixtures to prevent light trespass. On timers to reduce light pollution.

The applicant meets the four Prerequisite Measures and two Qualifying measures for lot coverage. A landscape maintenance plan is included on Sheet L-1. Prequalified SDP status is recommended.

Attachments:

1. Maps
2. Minutes from July 26, 2016 Planning Commission Regular meeting.
3. Explanation of SDP measures, submitted by Guido Architects, Inc., dated 12/1716.
4. Site plan

cc: Applicant
File/SDP

City of Troy GIS Online

752 0 376 752 Feet

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

City of Troy GIS Online

752 0 376 752 Feet

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

8. PUBLIC HEARING - SPECIAL USE REQUEST AND PRELIMINARY SITE PLAN REVIEW (File Number SU JPLN2016-0017) – Proposed 1-800 Self Storage Facility, East side of Coolidge, South of Maple (1330 Coolidge), Section 32, Currently Zoned MR (Maple Road) District

Mr. Carlisle reported on the proposed 1-800 Self Storage facility. He addressed the two phases of the project, its proximity to the Oakland/Troy Airport and related Federal Aviation Administration (FAA) regulations, sustainable design option for the Phase 2 and screening between adjacent uses.

Present were the applicant Joseph Guido and property owner/partner Eugene Sherizen.

There was discussion on:
- Sustainable design standards.
- FAA regulations and approval process.
- Screening as relates to landscaping, fencing, building visibility and security.

Members of the Planning Commission expressed overall support of the proposed use and site design. The members agreed to ask the applicant to come back before the Board after sustainable design standards are finalized and the FAA approval is complete.

PUBLIC HEARING OPENED

No one was present to speak.

PUBLIC HEARING CLOSED

Resolution # PC-2016-07-051
Moved by: Tagle
Support by: Hutson

RESOLVED, To postpone Special Use Approval and Preliminary Site Plan Approval for the proposed 1-800 Self Storage Facility, East side of Coolidge, South of Maple (1330 Coolidge), Section 32, Currently Zoned MR (Maple Road) District, until the applicant fulfills the requirements of the Sustainable Design Committee and has a definitive response from the FAA.

Yes: All present (8)
Absent: Faison

MOTION CARRIED

Guido Architects Inc.
Architects / Planners

23419 Ford Road
Dearborn, Michigan 48128
Voice (313) 274-7800 Fax (313) 274-7808
Email jguido@guidoarchitects.com

December 17, 2016

To: Mr. Brent Savident
City of Troy, MI

Re: Sustainable Design Measures for 1-800 Self Storage.com, 1330 Coolidge, Troy, MI

Dear Brent,

Please accept this letter outlining the sustainable design measures that will be incorporated into the design of the proposed self-storage development referenced above. These measures are being incorporated as related to a 7% excess lot coverage.

Per the ordinance requirements, please note the following:

Prerequisite A:

Storm Water Quality-

The plan provides for approximately 1650 s. f. of rain garden area draining approximately 2250.s.f. of hard surface paving to improve the quality of the storm water discharge by filtering it through the rain garden before it enters the storm water system.

Storm Water Quantity-

The plan provides for approximately 1650 s.f. of raingarden area and related plantings that will reduce the volume of direct storm water discharge into the storm system. In addition, there is also 400 s.f. of pervious paving at the employee parking area that will further reduce the direct storm water runoff into the storm water system. Also, there is an underground storm water manifold detention system planned that will provide both a controlled water flow discharge rate into the city main during a heavy rain event, as well as a sediment chamber to improve the quality of the storm water discharge.

Prerequisite E:

Heat Islands-

The building will have a white-color Duro-Last roof membrane with a solar reflectance of 0.88 as compared to a reflectance of .26 for a dark gray roof. This will serve to reflect substantially more of the heat normally absorbed by a black membrane roof system. The roofing membrane specification is attached.

Prerequisite F:

Water Efficient Landscaping-

The landscape plantings proposed for this site, as listed in the planting schedule, are plant types that are considered water-efficient. In addition, the planting beds will be mulched rather than planted with grass, which would require continual watering.

Qualifying B:

Redevelopment and Re-use-

The site is currently occupied by an obsolete industrial building that has been vacant for several years. It appears that there is no market demand for its re-use as an industrial building. The removable of the existing building and proposed re-development of this site for self-storage use will maximize the currently under-utilized site and return it to current property tax levels while providing new employment opportunities.

Qualifying D:

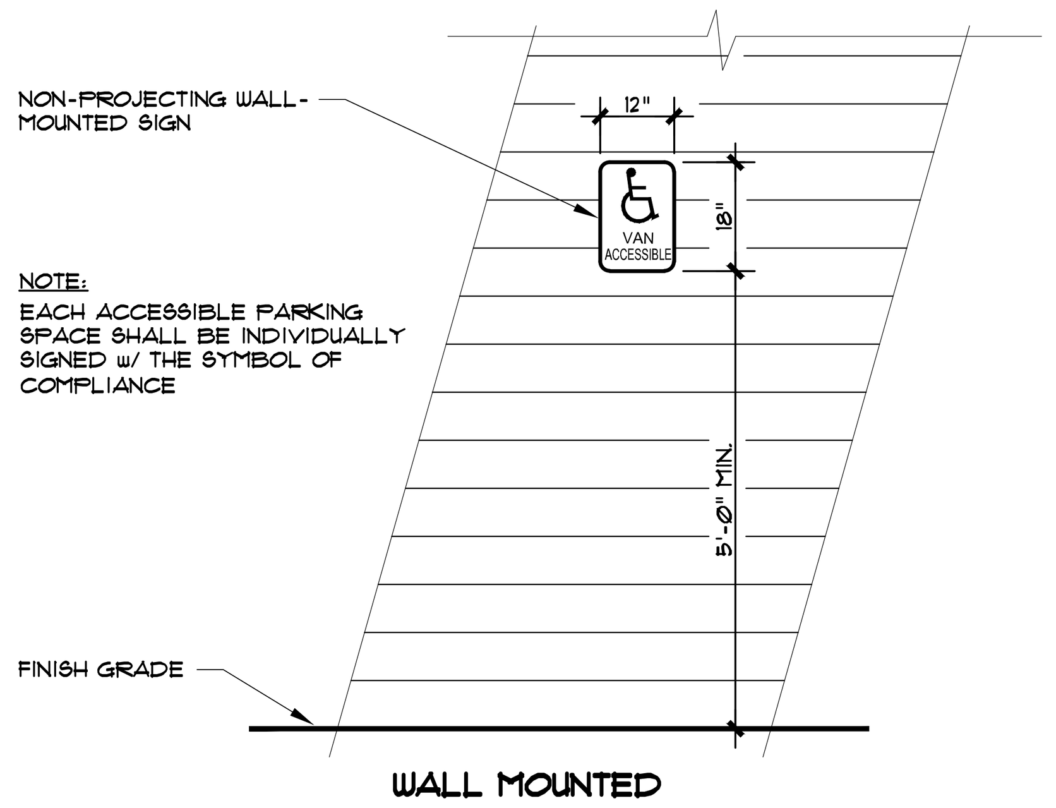
Light pollution-

The site lighting proposed utilizes state-of-the-art, energy-efficient LED fixtures with cut-off features to prevent light trespass to adjacent properties. The site photometric is attached. Additionally, the light spread is directed downward to avoid upward night-sky illumination. Light fixtures B-4, B-6 and D1-4 will be circuited to goon at dusk and off at 11pm. Fixtures B-1, B-3, B-5, C-1, C-2, and A-28 will go on at dusk and remain on until dawn. The light fixture photometric report is also attached.

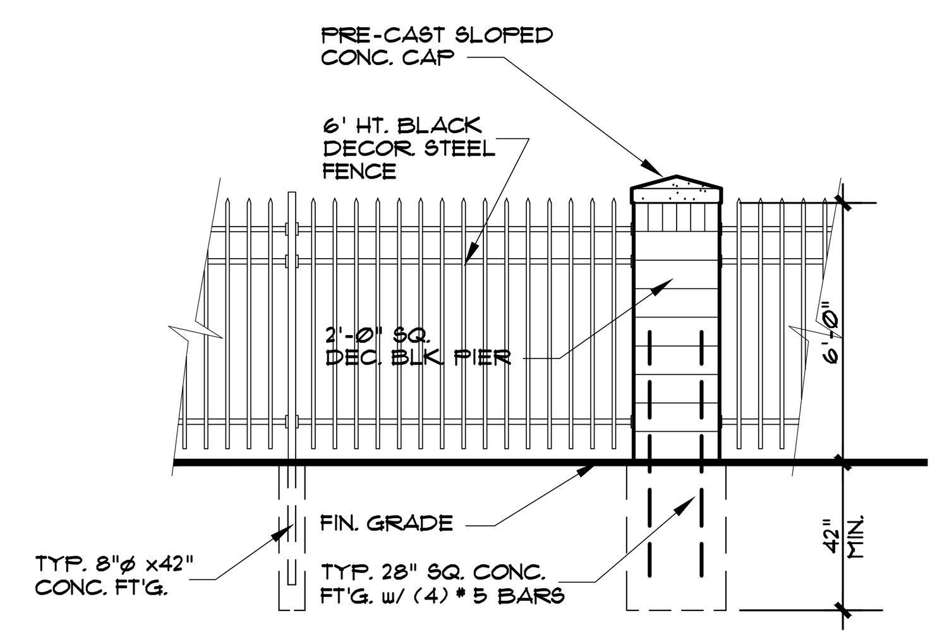
Respectfully Submitted,

Joseph A. Guido

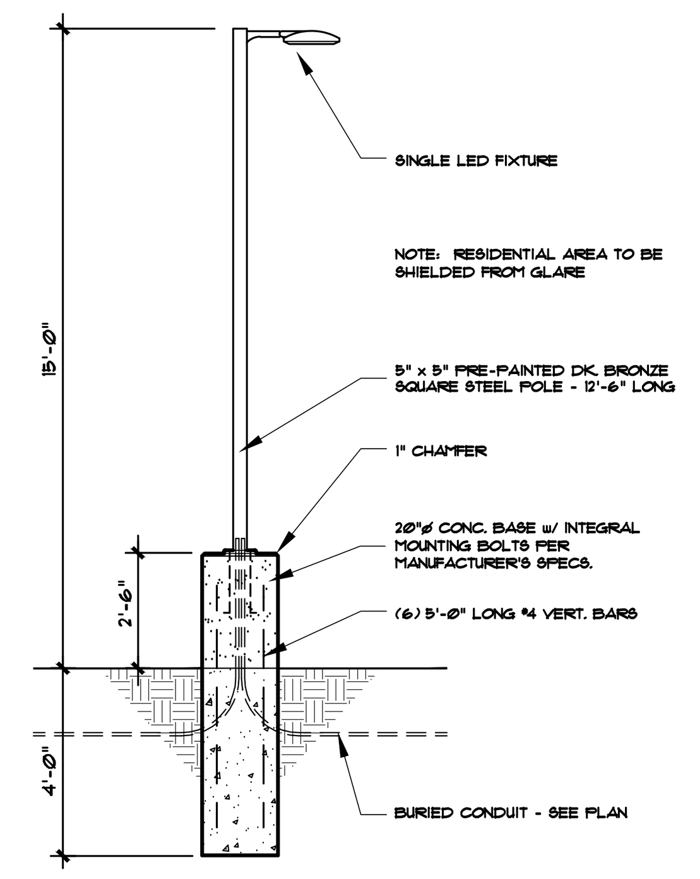
Joseph A. Guido, Architect



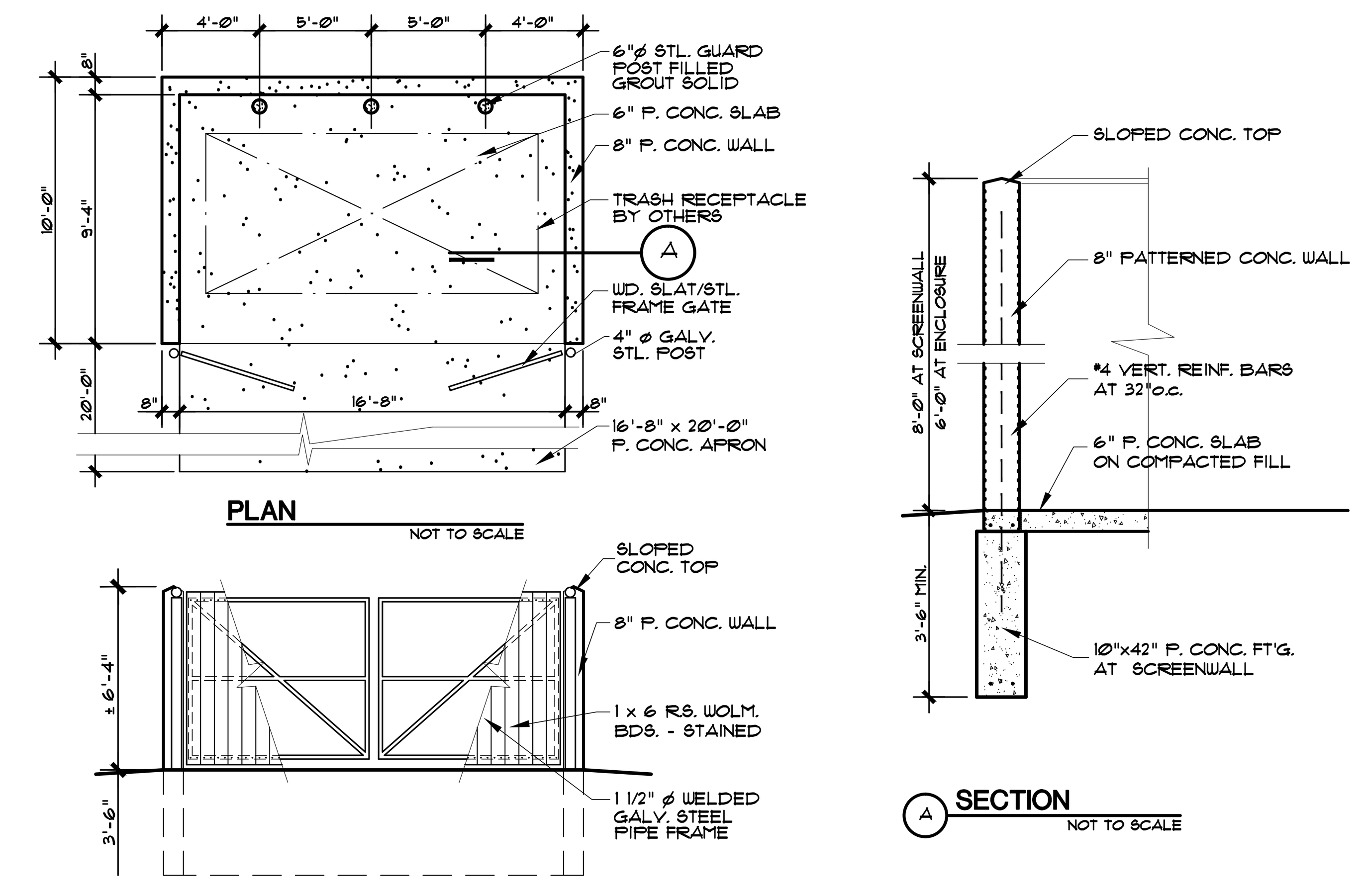
P.H. PARKING SIGNAGE
(PHASE I CONST.) NOT TO SCALE



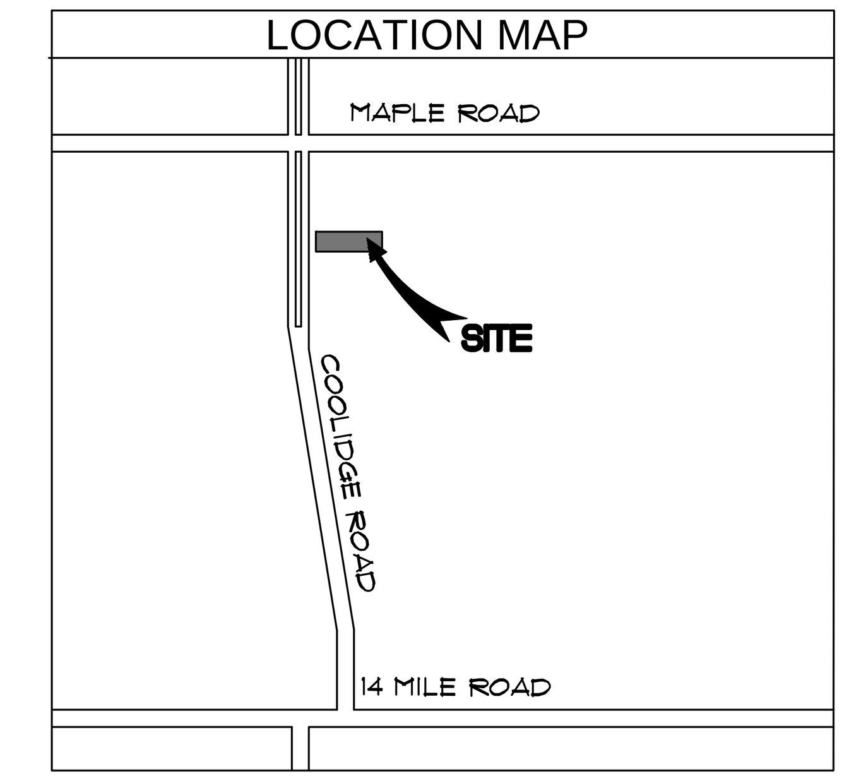
DECOR. FENCE / PIER DETAIL
(PHASE I CONST.) NOT TO SCALE



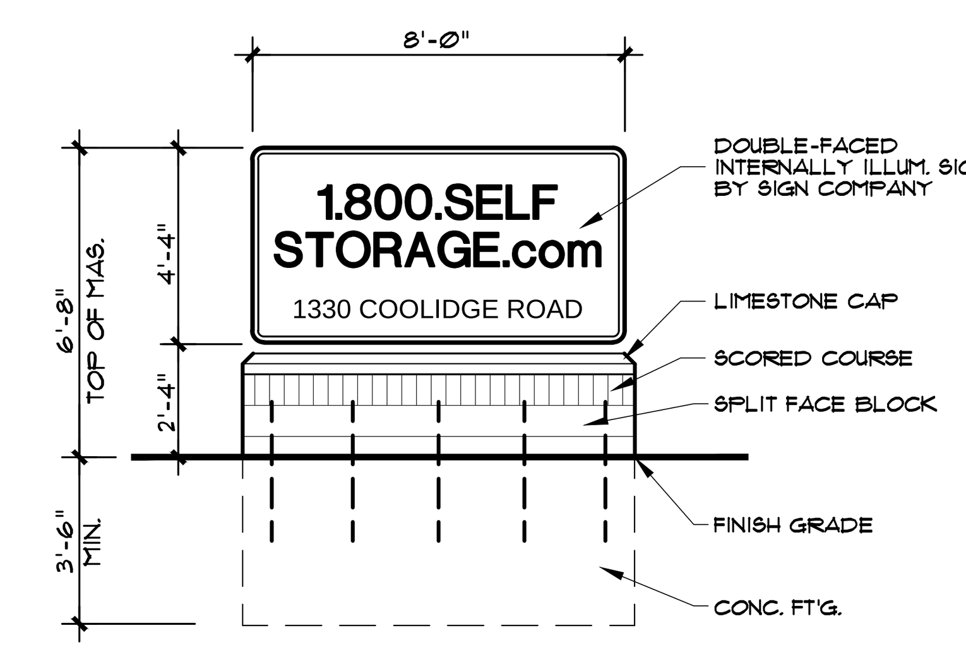
TYPICAL LIGHT STANDARD
(PHASE I CONST.) NOT TO SCALE



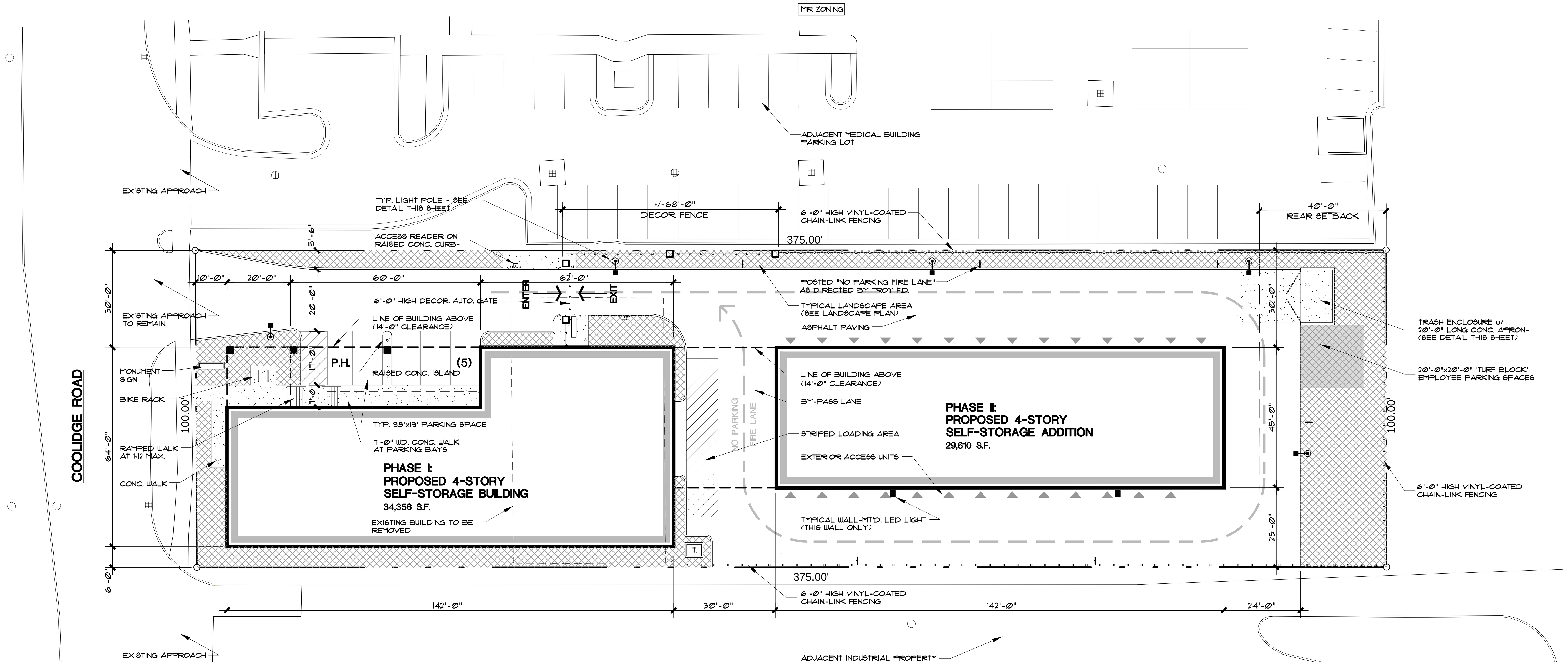
TRASH ENCLOSURE WALL
(PHASE II CONST.) NOT TO SCALE



LOCATION MAP
NORTH
NOT TO SCALE



MONUMENT SIGN DETAIL
(PHASE I CONST.) NOT TO SCALE



SITE PLAN
NORTH
SCALE: 1" = 20'-0"

NOTES:
1. INSTALL A KNOX BOX FOR GATE AND BUILDING.
2. NO TRUCK RENTAL IS PROPOSED FOR THIS FACILITY.

PROPERTY DESCRIPTION:

LOT 15 OF "MAPLE COOLIDGE ESTATES", A SUBDIVISION OF PART OF THE NW 1/4 SECTION 32, T. 2 N., R. 11 E., TROY TWP. (NOW CITY OF TROY), OAKLAND COUNTY, MICHIGAN ACCORDING TO THE PLAT RECORDED IN LIBER 47 OF PLATS, PAGE 51, OAKLAND COUNTY RECORDS.

CONTAINS 37,568.7 SQ. FT. OR 0.8624 ACRES

A.K.A. 1330 COOLIDGE HWY., TROY, MI 48084
TAX ID No. 20-32-101-014

SITE DATA:

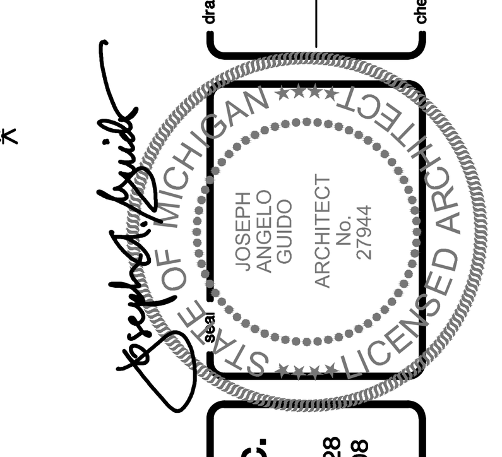
CURRENT ZONING:	MR MAPLE ROAD
PROPOSED ZONING:	MR MAPLE ROAD
GROSS SITE AREA:	37,568 S.F. (.86 Ac.)
BUILDING PAD AREA:	7,490 S.F. (PHASE I) 13,880 S.F. (PHASE I & II)
COVERAGE:	20% (PHASE I) 37% (PHASE I & II)
LANDSCAPE AREA:	6,585 S.F. (PHASE I & II) (5,635 S.F. REQ'D.)
COVERAGE:	18% (PHASE I & II)
FRONT SETBACK:	REQUIRED - 10 FT. PROVIDED - 10 FT.
REAR SETBACK:	REQUIRED - 40 FT. PROVIDED - 51 FT. (PHASE I & II)
SIDE SETBACKS:	REQUIRED - 0 FT. PROVIDED - 30 FT. (NORTH) 6 FT. (SOUTH)
PARKING REQUIRED:	5 SPACES (489 UNITS)
PARKING PROVIDED:	7 SPACES INC. (1) POSTED 8' WIDE VAN ACCESS. SPACE

revised	
LANDSCAPE DATA	7/21/16
ADDEDLANDSCAPE AREA AT ENTRY	8/5/16

issued	date
REVIEW	4/28/16
S.L.U. / S.P.A.	5/27/16

drawn: J.A.G.
checked:

seal



Guido Architects Inc.
Architects / Planners
23419 Ford Road Dearborn, MI 48128
(313) 274-7800 Fax (313) 274-7808
Email: jguido@guidoarchitects.com

project name: 1.800.SELF STORAGE.com
1330 COOLIDGE ROAD TROY, MICHIGAN
SITE PLAN

job no. 1609

sheet SP-1

LANDSCAPE DEVELOPMENT NOTES:

PLANTING

1. Installation of all plant material shall be in accordance with the latest edition of the *American Association of Nurserymen Standards for Nursery Stock* and with the specifications set forth by the City of Troy, Michigan.
2. The plant materials shall conform to the type stated on the plant list. Sizes shall be the minimum stated on the plant list or larger. All measurements shall be in accordance with the latest edition of the *American Association of Nurserymen Standards for Nursery Stock*.
3. The plant material shall be nursery grown and inspected by the Owner's representative before planting. The Owner's representative reserves the right to reject any plant material at any time.
4. Plants designated "B&B" shall be balled and burlapped with firm balls of earth.
5. Dig shrub pits one foot (1') larger than the shrub rootball, tree pits three (3) times the width of the tree rootball and backfill with one (1) part topsoil and one (1) part soil from excavated pit. Plant trees and shrubs at the same grade level at which they were planted at the nursery. If wet, clay soils are evident, plant trees and shrubs slightly higher.
6. The Contractor is responsible for planting the materials at the correct grades and spacing. The plants shall be oriented to give the best appearance.
7. When the plant has been properly set, the pit shall be backfilled with the topsoil mixture, gradually filling, patting, and settling with water.
8. Trees in lawn areas to have a four foot (4') circle of mulch, four inches (4') deep, and three inches (3") away from the trunk. Shrub beds are to be mulched with shredded bark mulch to a minimum depth of four inches (4"). Only natural color shredded hardwood bark mulch will be accepted.
9. Remove all twine, wire, and burlap from the top one third (1/3) of tree and shrub root balls and from tree trunks. Remove all non-biodegradable material such as plastic or nylon completely from branches and stems.
10. All plant materials shall be pruned and injuries repaired. The amount of pruning shall be limited to the removal of dead or injured limbs and to compensate for the loss of roots from transplanting. Cuts should be flush, leaving no stubs. Cuts over three quarters of an inch (3/4") shall be painted with tree paint. Shrubs along the site perimeter shall be allowed to grow together in a natural form.
11. Organic, friable topsoil shall be evenly distributed and fine graded over all areas to receive lawns at uniform depth of four inches (4") after settlement.
12. All lawn areas shall be sodded with a Grade A Kentucky Blue Grass blend over the topsoil. Peat sod is not acceptable.
13. All plantings shall be completed within three (3) months, and no later than November 30, from the date of issuance of a certificate of occupancy if such certificate is issued during the April1 thru September 30 period; if the certificate is issued during the October 1 thru March 31 period, the planting shall be completed no later than the ensuing May 31; plantings shall thereafter be reasonably maintained, including permanence and health of plant materials to provide a screen to abutting properties and including the absence of weeds and refuse.
14. Backfill directly behind all curbs and along sidewalks and compact to the top of curbs or walk to support vehicle and pedestrian weight without settling.
15. All landscape areas, especially parking lot islands and landscape beds next to buildings shall be excavated of all building materials and poor soils to a depth of twelve inches to eighteen inches (12"-18") and backfilled with good, medium-textured planting soil (loam or light yellow clay). Add four inches to six inches (4"-6") of topsoil over the fill material and crown a minimum of six inches (6") above the top of curbs and/or walks after earth settling unless otherwise noted on the landscape plan.
16. Conversion of all asphalt and gravel areas to landscape planting beds shall be done in the following manner:
    a. Remove all asphalt, gravel, and compacted earth to a depth of six inches to eighteen inches (6"-18") depending on the depth of the sub base and dispose of off site;
    b. Call the City for an inspection prior to backfilling;
    c. Replace excavated material with good, medium-textured planting soil (loam or light yellow clay) to a minimum of two inches (2") above the top of the curb and sidewalk, add four inches to six inches (4"-6") of topsoil and crown to a minimum of six inches (6") above the adjacent curb and walk after earth settling, unless otherwise noted on the landscape plan.
    If conversion from asphalt to landscape occurs in or between an existing landscape area(s), replace excavated material from four inches to six inches (4"-6") below adjacent existing grade with good, medium-textured planting soil (loam or light yellow clay) and add four inches to six inches (4"-6") of topsoil to meet existing grades after earth settling.
17. Elevate the rootballs of Yew shrubs to allow for better drainage.

MATERIAL

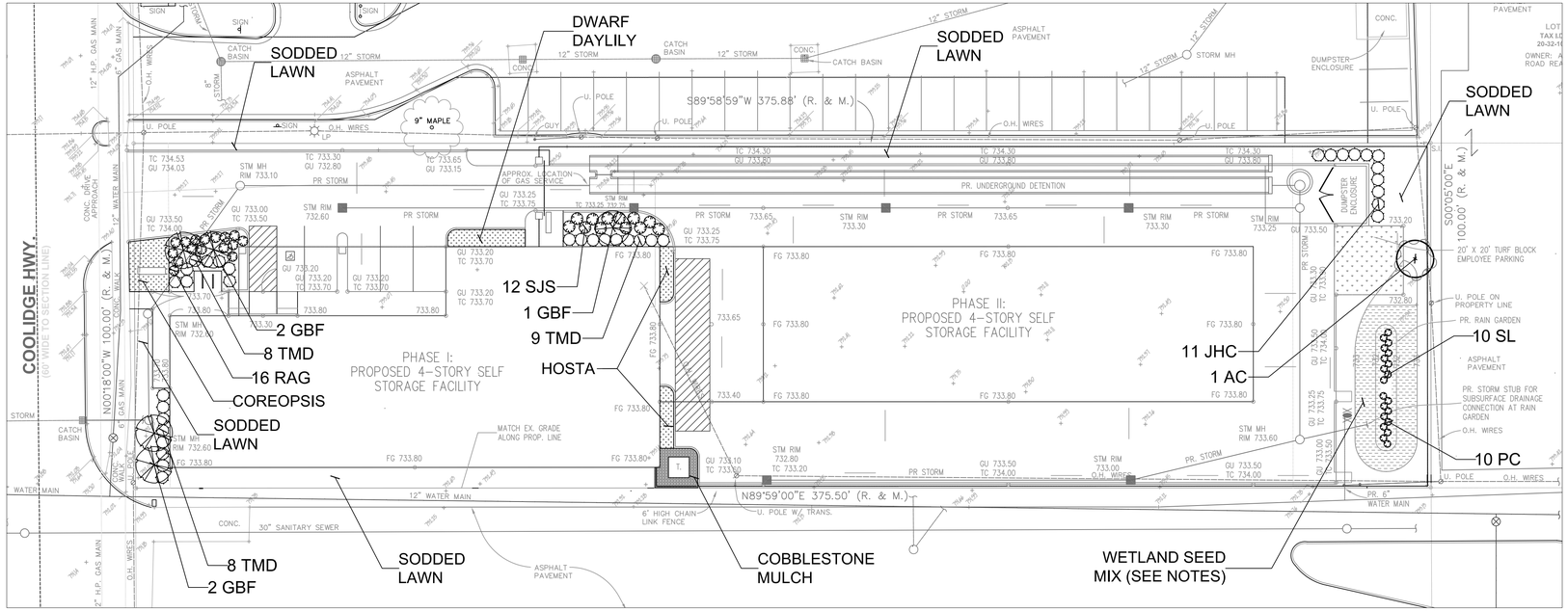
1. Required landscape material shall satisfy the criteria of the *American Association of Nurserymen Standards for Nursery Stock* and be:
    a. Nursery grown;
    b. State Department of Agriculture inspected;
    c. No. 1 grade material with a straight, unscarred trunk, and well-developed uniform crown (park grade trees will not be accepted);
    d. Staked, wrapped, watered, and mulched according to the details provided; &
    e. Guaranteed for one (1) year.
2. Topsoil shall be friable, fertile soil of clayloam character containing at least five percent (5%) but not more than twenty percent (20%) by weight of organic matter with a pH range between 6.0 and 7.0. The topsoil shall be free from clay lumps, coarse sand, plant roots, sticks, and other foreign materials.
3. The seed mixture shall consist of the following types and proportions: Kentucky Blue Grass blend "Baron/Sheri/Adelphi" @ sixty percent (60%), Chewing Fescue @ twenty-five percent (25%), Creeping Red Fescue @ ten percent (10%), and Perennial Rye Grass @ five percent (5%). Weed content shall not exceed one percent (1%). The mix shall be applied at a rate of 200 pounds per acre.
4. Sod shall be two (2) year old "Baron/Sheri/Adelphi" Kentucky Blue Grass blend grown in a sod nursery on loam soil.
5. Cobblestone mulch in the parking lot islands to consist of two inch to four inch (2" - 4") cobbles six inches (6") deep over geotextile fabric.

GENERAL

1. Do not plant deciduous or evergreen trees directly over utility lines or under overhead wires. Maintain a six foot (6') distance from the centerline of utilities and twenty feet (20') from the centerline of overhead wires for planting holes. Call MISS DIG forty-eight (48) hours prior to landscape construction for field location of utility lines.
2. The Contractor agrees to guarantee all plant material for a period of one (1) year. At that time, the Owner's representative reserves the right for a final inspection. Plant material with twenty-five percent (25%) die back, as determined by the Owner's representative shall be replaced. This guarantee includes the furnishing of new plants, labor, and materials. These new plants shall also be guaranteed for a period of one (1) year.
3. The work shall consist of providing all necessary materials, labor, equipment, tools, and supervision required for the completion as indicated on the drawings.
4. All landscape areas including parking lot islands shall be irrigated by an automatic underground irrigation system. Lawns and shrub/landscape areas shall be watered by separate zones to minimize overwatering.
5. All written dimensions override scale dimensions on the plans.
6. Report all changes, substitutions, or deletions to the Owner's representative.
7. All bidders must inspect the site and report any discrepancies to the Owner's representative.
8. All specifications are subject to change due to existing conditions.
9. The Owner's representative reserves the right to approve all plant material.

MAINTENANCE OF GENERAL LANDSCAPE AREAS

1. The Owner of the landscaping shall perpetually maintain such landscaping in good condition so as to present a healthy, neat, and orderly appearance, free from refuse and debris.
2. The Owner shall conduct a seasonal landscape maintenance program including regular lawn cutting (at least once per week during the growing season), pruning at appropriate times, watering, and snow removal during winter.
3. All diseased and/or dead material shall be removed within sixty (60) days following notification and shall be replaced within the next appropriate planting season or within one (1) year, whichever comes first.
4. Any debris such as lawn clippings, fallen leaves, fallen limbs, and litter shall be removed from the site on a weekly basis at the appropriate season.
5. All planting beds shall be maintained by removing weeds, fertilizing, and replenishing mulch as needed.
6. Annual beds shall be kept free of weeds and mulched with sphagnum peat of a neutral pH as needed. Perennial beds shall be kept free of weeds and mulched with fine textured shredded bark as needed. Cut spent flower stalks from perennial plants at regular intervals.



LANDSCAPE PLANTING PLAN

scale: 1" = 20'

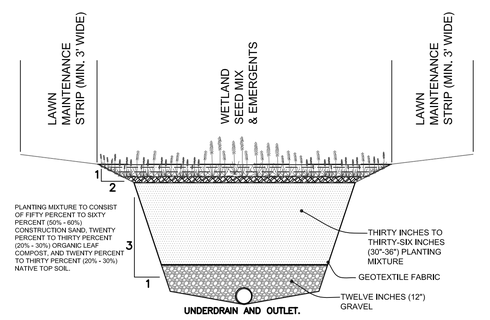
PLANT LIST

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE
AC	1	*Amelanchier canadensis*	Serviceberry	2-1/2" cal. B&B
GBF	5	*Gingko biloba* 'Fastigiata'	Fastigiate Maidenhair Tree	2-1/2" cal. B&B
JHC	11	*Juniperus chin.* 'Hetz Columnaris'	Hetz Columnar Juniper	4' - 5' ht. B&B
RAG	16	*Rhus aromatica* 'Gro-Low'	Gro-Low Fragrant Sumac	24" ht., 3 gal. pot
SJS	12	*Spiraea japonica* 'Shirobana'	Shibori Japanese Spirea	24" ht., 3 gal. pot
TMD	25	*Taxus x media* 'Densiformis'	Densiformis Yew	24" ht. B&B
CVM	*	*Coreopsis verticillata* 'Moonbeam'	Moonbeam Threadleaf Coreopsis	1 gal. pot, 24" o.c.
HHR	*	*Hemerocallis sp.* 'Happy Returns'	Happy Returns Daylily	1 gal. pot, 24" o.c.
HSG	*	*Hosta sp.* 'Stained Glass'	Stained Glass Hosta	1 gal. pot, 24" o.c.
PC	10	*Pontederia cordata*	Pickeral Weed	Bare Root
SL	10	*Sagittaria latifolia*	Broad-Leaf Arrowhead	Bare Root

* Landscape Contractor to determine the quantity in the field.

LANDSCAPE CALCULATIONS:

LANDSCAPING ADJACENT TO ROADS
Coolidge Highway (100 l.f.)
* One (1) deciduous tree / 30 l.f. = 3.33 trees = 4 trees
PARKING LOT LANDSCAPING (7 spaces)
* One (1) deciduous tree for every eight (8) parking spaces equals 0.875 tree or 1 tree
SITE LANDSCAPING (Site area: 37,568 sq. ft.)
* 37,568 sq. ft. x .15 equals 5,635 sq. ft.
* Site landscaping area provided equals 6,309 sq. ft.



RAIN GARDEN CROSS SECTION — not to scale

RAIN GARDEN PLANTING NOTES

1. **PLANTING SOIL:** Planting soil as specified in the cross section on this sheet. The maximum clay content is less than five percent (5%). The soil mixture should have a pH measurement between 5.5 and 6.5 and an infiltration rate greater than a half inch per hour. The soil should be a uniform mix, free of stones, roots, or other similar objects larger than two inches (2"). No other materials or substances should be mixed or dumped within the rain garden area that may be harmful to plant growth or prove a hindrance to planting or maintenance operations. The planting soil should be free from Bermuda Grass, Quack Grass, Johnson Grass, Mugwort, Nutsedge, Poison Ivy, Canada Thistle, or other noxious weeds.
2. **SAND:** Sand should be clean and free of deleterious materials. For planting soil, Michigan Department of Transportation Class II clean sand is recommended.
3. **SOIL PLACEMENT:** Placement of the planting soil in the rain garden area should be conducted in lifts of twelve inches to eighteen inches (12" - 18") and lightly compacted. Minimal compaction effort can be applied to the soil by tamping with a bucket from a dozer or backhoe. Do not use heavy equipment within the bioretention area. Grade the rain garden materials with light equipment such as a compact loader or a dozer / loader with marsh tracks.
4. **PLANTING:** Follow the Supplier's recommended procedures for bed preparation, installation, and soil erosion control measures of the proposed seeded areas. After the plants germinate and begin to grow follow the maintenance guidelines included on this sheet.
4. **COVER CROP:** Provide a cover crop of annual rye at a rate of ten pounds (10#) per acre and seed oats at a rate of twenty pounds (20#) per acre over the entire area to be seeded.

RAIN GARDEN SEED MIX

RAIN GARDEN SEED MIX
A composition of wildflowers, sedges, and grasses.
Application rate: 3 oz. per 1000 sq. ft. or 6 lbs. per acre

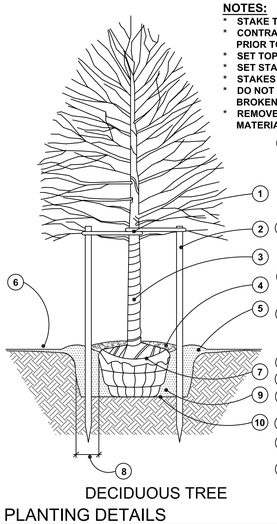
BOTANICAL NAME	COMMON NAME
Wildflowers	
Asclepias incarnata	Swamp Milkweed
Anemone canadensis	Canada Anemone
Aquilegia canadensis	Columbine
Aster novae-angliae	New England Aster
Chelone glabra	White Turtlehead
Coreopsis verticillata	Tall Tickseed
Eupatorium maculatum	Joe-Pye Weed
Eupatorium perfoliatum	Boneset
Fragaria virginiana	Wild Strawberry
Helenium autumnale	Sneezeweed
Iris virginica	Wild Blue Flag
Liatris spicata	Marsh Blazing Star
Monarda fistulosa	Bergamot
Penstemon digitalis	Beardtongue
Potentilla simplex	Old-Field Cinquefoil
Rudbeckia hirta	Black-Eye Susan
Rudbeckia triloburn	Green-Headed Coneflower
Solidago patula	Swamp Goldenrod
Tradescantia ohioensis	Spiderwort
Verbena hastata	Blue Vervain
Verbena urticiforia	White Vervain
Veronia missurica	Ironweed
Veronicastrum virginicum	Culver's Root
Sedges/Grasses	
Carex hystericina	Porcupine Sedge
Carex vulpinoidea	Fox Tail Sedge
Elymus virginicus	Virginia Wild Rye
Sorgastrum nutans	Indian Grass

RAIN GARDEN SEED MIX

SUPPLIER:
MICHIGAN WILDFLOWER FARM
11770 Cutler Road
Portland, Michigan 48875-9452
Phone: (517) 647 6010 Fax: (517) 647 6072
email: wildflowers @voyager.com

MAINTENANCE OF RAIN GARDEN:

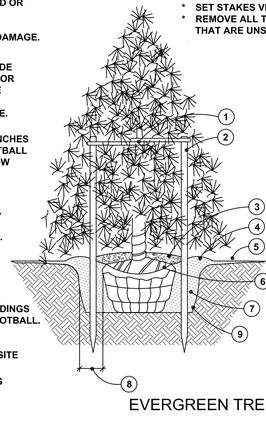
1. **WEEDING:** Weeding should be conducted on a regular basis and at least once a month. Weeding is particularly important during the establishment period to insure that unwanted plants do not become a problem. Weed once per month in April and May, twice per month in June and July, and once per month in August, September, and October. The native plants proposed should be marked at the time of planting to avoid confusion regarding unwanted plants.
2. **WATERING:** Watering should be performed as needed. During the establishment period after the initial planting, watering is very important and should be conducted every two to three (2-3) days. The initial planting should be checked regularly for appropriate moisture availability. Two (2) methods for determining adequate moisture levels include the following: a.) if the plants wilt during the day when the temperature is at its highest, but revive during the night, then watering is not necessary, and b.) by testing the soil moisture at a depth of four inches (4") by inserting a small rod into the soil. If the soil is moist at a depth of four inches (4"), then watering is not necessary. When possible, the best method for watering is by hand at the base of the plant.
3. **EDGING:** The edge of the rain garden should be maintained to avoid grass growing into the bioretention pond bed. The edge can be maintained with a V-notch cut edge or with steel or aluminum edging. If the V-notch system is used, the channel should be maintained at four inches (4") or greater and renewed every six to eight (6-8) weeks.
4. **CUTTING BACK:** Tall wildflowers should be cut back by one-third. Early flowering plants can be cut back in late June or early July and late flowering plants in late October.
5. **THINNING:** After the rain garden has become established and thriving, it may be necessary to thin perennials by dividing individual plants in the Spring or Fall.
6. **REPLACEMENT:** Any plants that die or become diseased should be replaced. Plant health should be checked regularly with replanted material occurring in the Spring or Fall.
7. **INFILTRATION:** Stormwater runoff should percolate through the system in four to six (4-6) hours. If pooling of water is evident after this time period check for blockages not allowing water seepage. If the problem is a result of fine sediments built up on the filter fabric, punch small holes in the filter fabric using a two foot to three foot (2'-3') runner four (#4) reinforcing rod. If the soils are the problem, install a sand filter at least one foot (1') in width between the mulch layer and the underdrain system. If a clean out pipe is installed as a part of the system, check for any blockages that may reduce water infiltration.
8. **REMOVAL OF LITTER AND DEBRIS:** Litter, trash, and debris should be removed on a regular basis to insure that inlets remain free flowing and to keep the area in a neat and attractive appearance.
9. **INORGANIC APPLICATIONS:** In general,rain gardens do not need fertilization as nutrients from surrounding areas is usually at an elevated level. If soil fertility appears to be an issue, the soil should be tested and appropriate actions taken based on the results. Insecticides, herbicides, fungicides, and rodenticides should not be used in the rain garden. If a plant is diseased or infested with insects, it should simply be removed and replaced.



NOTES:
* STAKE TREES UNDER FOUR INCH (4") CALIPER.
* CONTRACTOR TO VERIFY PERCOLATION OF PLANTING PIT PRIOR TO INSTALLATION.
* SET TOP OF BALL THREE INCHES (3") ABOVE FINISH GRADE.
* SET STAKES VERTICAL & EVENLY SPACED.
* STAKES OR GUYS TO BE SECURED ABOVE THE FIRST BRANCH.
* DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR BROKEN BRANCHES.
* REMOVE ALL TAGS, STRING, PLASTICS, AND OTHER MATERIALS THAT ARE UNSIGHTLY OR COULD CAUSE DAMAGE.

1. STAKE TREE JUST BELOW FIRST BRANCH USING TWO INCH TO THREE INCH (2"-3") WIDE BELT-LIKE MATERIAL OF NYLON, PLASTIC, OR OTHER ACCEPTABLE MATERIAL. (NO WIRE OR HOSE TO BE USED TO GUY TREES.) THREE (3) GUYS EVENLY SPACED PER TREE. REMOVE AFTER ONE (1) WINTER SEASON.
2. 2 x 2 HARDWOOD STAKES. POSITION SIX INCHES TO EIGHT INCHES (6"-8") OUTSIDE OF ROOTBALL AND EXTEND EIGHTEEN INCHES (18") BELOW TREE PIT INTO UNDISTURBED SOIL.
3. APPLY TREE WRAP AND SECURE WITH A BIODEGRADABLE MATERIAL AT TOP AND BOTTOM. REMOVE AFTER ONE (1) WINTER.
4. SHREDDED BARK MULCH OF A NATURAL COLOR AT FOUR INCH (4") MINIMUM DEPTH. LEAVE A THREE INCH (3") CIRCLE OF BARE SOIL AT THE BASE OF THE TREE.
5. MOUND TO FORM TREE SAUCER.
6. FINISH GRADE SLOPED AWAY FROM TREE.
7. CUT AND REMOVE WIRE, BURLAP, AND BINDINGS FROM THE TOP ONE-THIRD (1/3) OF THE ROOTBALL.
8. WIDTH OF ROOTBALL ON EACH SIDE.
9. PLANTING MIX SHALL BE AMMENDED PER SITE CONDITIONS AND PLANT REQUIREMENTS.
10. SCARIFY BOTTOM AND SIDES OF PLANTING PIT TO FOUR INCH (4") DEPTH.

DECIDUOUS TREE



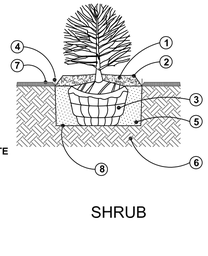
NOTES:
* STAKE ALL EVERGREEN TREES UNDER TWELVE FEET (12') HIGH. GUY ALL EVERGREEN TREES TWELVE FEET (12') HIGH AND OVER.
* CONTRACTOR TO VERIFY PERCOLATION OF PLANTING PIT PRIOR TO INSTALLATION.
* NEVER CUT CENTRAL LEADER. PRUNE ONLY TO REMOVE DEAD OR BROKEN BRANCHES.
* SET STAKES VERTICAL AND EVENLY SPACED.
* REMOVE ALL TAGS, STRING, PLASTICS, AND OTHER MATERIALS THAT ARE UNSIGHTLY OR COULD CAUSE GIRDLING.

1. STAKE TREE AS INDICATED USING TWO INCH TO THREE INCH (2"-3") WIDE BELT-LIKE MATERIAL OF NYLON, PLASTIC, OR OTHER ACCEPTABLE MATERIAL. (NO WIRE OR HOSE TO BE USED TO GUY TREES.) THREE (3) GUYS EVENLY SPACED PER TREE. REMOVE AFTER ONE (1) WINTER SEASON.
2. 2 x 2 HARDWOOD STAKES. POSITION SIX INCHES TO EIGHT INCHES (6"-8") OUTSIDE OF ROOTBALL AND EXTEND EIGHTEEN INCHES (18") BELOW TREE PIT INTO UNDISTURBED SOIL.
3. SHREDDED BARK MULCH OF A NATURAL COLOR AT FOUR INCH (4") MINIMUM DEPTH. LEAVE A THREE INCH (3") CIRCLE OF BARE SOIL AT THE BASE OF THE TREE.
4. MOUND TO FORM TREE SAUCER.
5. FINISH GRADE SLOPED AWAY FROM TREE.
6. CUT AND REMOVE WIRE, BURLAP, AND BINDINGS FROM THE TOP ONE-THIRD (1/3) OF THE ROOTBALL.
7. PLANTING MIX SHALL BE AMMENDED PER SITE CONDITIONS AND PLANT REQUIREMENTS.
8. WIDTH OF ROOTBALL ON EACH SIDE.
9. SCARIFY BOTTOM AND SIDES OF PLANTING PIT TO FOUR INCH (4") DEPTH.

EVERGREEN TREE

GENERAL NOTES FOR ALL PLANTINGS:
* DO NOT CUT CENTRAL LEADER.
* REMOVE ALL TAGS, STRINGS,PLASTICS, AND ANY OTHER NON-BIODEGRADABLE MATERIALS (EXCEPT LABEL FOR PLANT NAME) FROM PLANT STEMS OR CROWN WHICH ARE UNSIGHTLY OR COULD CAUSE GIRDLING.
* PLANTS SHALL BEAR THE SAME RELATION TO FINISH GRADE AS IT BORE TO THE PREVIOUS GRADE IN THE NURSERY. SET THE BASE OF THE PLANT SLIGHTLY HIGHER THAN EXISTING GRADE IF PLANTING IN CLAY SOILS.
* CENTER THE ROOTBALL IN THE PLANTING HOLE. LEAVE THE BOTTOM OF THE PLANTING HOLE FIRM. USE WATER TO SETTLE THE PLANTING MIX AND REMOVE ANY AIR POCKETS AND FIRMLY SET THE TREE OR SHRUB. GENTLY TAMP IF NEEDED.

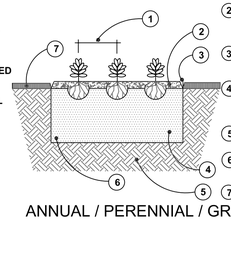
NOTE:
* CONTRACTOR TO VERIFY PERCOLATION OF PLANTING PIT PRIOR TO INSTALLATION.



1. SHREDDED BARK MULCH AT FOUR INCH (4") MINIMUM DEPTH. MULCH SHALL BE NATURAL IN COLOR.
2. FORM A SAUCER WITH MULCH AND SOIL AROUND SHRUB BED.
3. CUT AND REMOVE BURLAP AND BINDINGS FROM THE TOP ONE-THIRD (1/3) OF THE ROOTBALL.
4. 3/16" x 4" ALUMINUM EDGING (OR APPROVED EQUIVALENT) OR SPADED EDGE.
5. EXCAVATE PLANTING HOLE AND BACKFILL WITH PREPARED PLANTING MIX.
6. UNDISTURBED SUBGRADE.
7. LAWN.
8. SCARIFY SUBGRADE.

SHRUB

NOTE:
* CONTRACTOR TO VERIFY PERCOLATION OF PLANTING PIT PRIOR TO INSTALLATION.
* PERENNIALS TO BE PLANTED UP TO THE EDGE OF THE SAUCER AROUND A TREE OR SHRUB BED.

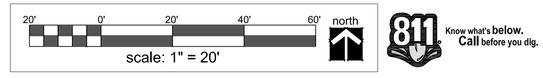


1. SEE PLANT LIST FOR SPACING DISTANCE.
2. SHREDDED HARDWOOD BARK OF A NATURAL COLOR MULCH AT FOUR INCH (4") MINIMUM DEPTH.
3. 3/16" x 4" ALUMINUM EDGING (OR APPROVED EQUIVALENT) OR SPADED EDGE.
4. EXCAVATE PLANTING BED AND BACKFILL WITH PREPARED PLANTING MIX AT A TEN INCH (10") DEPTH.
5. UNDISTURBED SUBGRADE.
6. PLANTING MIX TO CONSIST OF EQUAL PARTS OF SAND, LEAF COMPOST, AND NATIVE SOIL.
7. LAWN.

ANNUAL / PERENNIAL / GROUNDCOVER

PLANTING DETAILS — not to scale

date: May 25, 2016
revised:
07-21-2016 Revise SITE LANDSCAPING calculation.



Know what's below. Call before you dig.

LANDSCAPE PLAN FOR:
Guido Architects, Inc.
23149 Ford Road
Dearborn, Michigan 48128
(313) 274-7800

LANDSCAPE PLAN BY:
Nagy Devlin Land Design, L.L.C.
31736 West Chicago Ave.
Livonia, Michigan 48150
(734) 634-9208

PROJECT LOCATION:
1 800 SELF STORAGE
1330 Coolidge Highway
Troy, Michigan

STATE OF MICHIGAN — J. BRIAN DEVLIN NO.1260 — REGISTERED LANDSCAPE ARCHITECT
J. Brian Devlin AUTOCAD SIGNATURE ORIGINAL IN BLUE

L - 1: LANDSCAPE PLAN

* Base data provided by Community Engineering & Surveying.

PURDUE UNIVERSITY

PURDUE EXTENSION

HO-252-W

Commercial Greenhouse and Nursery Production

Drought-tolerant Plants

Michael V. Mickelbart,
Purdue Horticulture and Landscape Architecture

Matthew A. Jenks,
USDA Arid-Land Agricultural Research Center, Maricopa, Arizona

EXPERT REVIEWED

Purdue Horticulture and Landscape Architecture
www.ag.purdue.edu/HLA

The eastern half of the United States is generally characterized by frequent summer rains that are sufficient to meet the water requirements of most, if not all, landscape plants. However, late summer water stress is common in the Midwest. The more severe droughts that occur in some years remind us that we cannot take adequate rainfall for granted.

Some locations — whether several square miles or a few square feet — are more prone to drought than others. For such locations, it is important to select plants that can tolerate dry conditions. Since they are such an important part of the landscape, this publication describes characteristics that make trees tolerant to drought, and then lists drought-resistant trees, shrubs, and groundcovers for Midwest landscapes.

Characteristics of Drought-tolerant Trees

Leaves can tell us a lot about whether a particular plant is likely to be more or less drought-tolerant. Understanding some common leaf traits and how they relate to drought tolerance can be useful when selecting trees for a particular landscape.

Plants lose water through a process called transpiration. Stomata (the pores in leaves) are necessary to allow carbon dioxide to enter the leaves for photosynthesis, but in the process, water is lost. Transpiration is important for other processes, including the movement of nutrients throughout the plant. However, water loss can lead to reduced growth or even death if it is not controlled in the plant.

Figure 1. *Drought-tolerant plants often have smaller leaves or shorter needles. They also can accumulate waxes on their leaves or needles (like this blue spruce). Waxes are thought to prevent water loss from these organs.*

Plants have a number of ways to reduce the water loss that occurs through transpiration. One is to simply reduce leaf area. When water stress is an issue, large leaf areas can be detrimental to growth and survival because there is more surface area from which water can be lost. Therefore, drought-tolerant plants will often have small leaves, or in the case of conifers, needles with small surface areas (Figure 1).

Figure 2. *Deep sinuses (the indentations between leaf lobes) reduce leaf area, which can limit water loss.*

While this is generally true, there are many plants that have large leaf areas that are drought-tolerant, such as southern magnolia, hardy rubber trees, and sycamore. Many of the plants on our List of Drought-tolerant Trees, Shrubs, and Groundcovers (below) have very large leave surface areas, so leaf size alone does not always indicate drought tolerance.

Another way plants can reduce leaf area is to have deep sinuses (the indentations between lobes on a leaf). Trees that are more tolerant of dry conditions often have deep sinuses, which decreases their total leaf area (Figure 2).

Another sign of drought-tolerance is leaves that have a heavy accumulation of waxes. The waxes often appear as a whitish-blue coating, such as that seen on blue spruce needles (Figure 1). The waxes that plants produce have many functions, but one of them is to reduce the amount of water that leaves or needles lose during dry conditions. The waxes simply make it more difficult for water to evaporate from inside the leaf to the outside.

While we still don't fully understand how leaf hairs (or trichomes) affect plant water loss, leaves that are covered with these small hairs typically lose less water than those that do not. Therefore, when selecting trees and shrubs for dry areas of the landscape, look for leaves with a thick covering of trichomes (Figure 3).

Native Trees and Drought Tolerance

Does native mean drought tolerant?

Not necessarily. First, it is important to carefully define the term *native*. If two different species grow in natural populations that are, for example, just 10 miles apart (and have been present in those areas for, say, hundreds of years), they might be grouped together with other plants of the greater geographical region as being "native." However, if the different local areas where these plants grow differ drastically in their soil conditions (water and nutrient availability, structure, and so on), exposure, or temperature, you should not assume they will perform similarly when transplanted to a new site in the landscape.

Figure 3. *Trichomes (hairs) may reduce water loss from leaves.*

For example, a perennial plant that is native to the Midwest prairie is a drought-tolerant plant, but a fern that is native to high rainfall mountain ranges is not, even if these two areas are within the same state or local region. Many people assume that all native plants will thrive in a dry area with no additional water. Many native species in the eastern United States, in fact, require large amounts of water because they are either native to high-rainfall areas or stream banks.

Even trees that are native to dry environments can experience drought stress. Severe seasonal droughts with lower than average rainfall can produce water stress even in drought-tolerant plants. In landscape environments, trees compete with turf and other plants for water. Hardscapes such as sidewalks also can limit water entry into soils, as can the soil compaction typical of suburban and urban areas. Furthermore, in natural environments, leaf debris helps maintain soil water. But that debris is usually removed from managed landscapes.

This concept becomes even more applicable when we talk about plants that are native to the United States. If we compare red maple trees from Texas to those from the northeast part of the country, they are very different in their adaptations, even though they are the same species. The trees from Texas will have many of the characteristics of drought-tolerant trees described above: small leaves, thick cuticles, and deeper sinuses. These are all adaptations to low-water environments and, as described above, indicate that these trees will be more tolerant of dry landscape conditions.

List of Drought-tolerant Trees, Shrubs, and Groundcovers

We have compiled a list of trees, shrubs, and groundcovers that are drought-tolerant and suitable for landscapes in the eastern United States. This list is based on the personal experiences of professional horticulturists and scientific research reports in various publications. To “make the cut,” each of these plants had to appear in at least three independent scientific or professional reports of woody plant drought tolerance. Use this list as a guide when selecting plants that need to tolerate dry conditions.

Scientific Name	Common Name
Trees	
Acer buergeranum	trident maple*
Acer campestre	hedge maple*
Acer saccharinum	silver maple
Acer tataricum ssp. *ginnala*	amur maple
Asimina triloba	pawpaw
Carpinus caroliniana	American hornbeam
Carya spp.	pecan
Catalpa speciosa	northern catalpa
Cedrus libani	cedar of Lebanon*
Celtis occidentalis	hackberry
Cercis canadensis	eastern redbud
Cladrastis kentukea	yellowwood
Corylus colurna	Turkish filbert
Crataegus spp.	hawthorns (most)
Diospyros virginiana	persimmon
Elaeagnus angustifolia	Russian olive
Ginkgo biloba	ginkgo
Gleditsia triacanthos	honey locust
Gymnocladus dioicus	Kentucky coffeetree
Koelreuteria paniculata	goldenraintree
Maclura pomifera	osage orange
Morus alba	white mulberry
Ostrya virginiana	hop hornbeam*
Parrotia persica	Persian parrotia*
Phellodendron amurense	amur corktree
Picea omorika or P. pungens	Serbian spruce/Colorado spruce
Pinus spp.	pines (most)
Platanus x acerifolia	London plane tree
Populus tremuloides	quaking aspen
Prunus cerasifera	cherry plum
Quercus macrocarpa	bur oak
Quercus prinus	chestnut oak
Quercus muehlenbergii	chinquapin oak
Quercus rubra	red oak
Quercus alba	white oak
Robinia pseudoacacia	black locust
Sassafras albidum	sassafras
Styphnolobium japonicum	Japanese pagodatree
Syringa reticulata	Japanese tree lilac
Tilia tomentosa	silver linden
Ulmus parvifolia	lacebark elm
Ulmus propinqua	Japanese elm
Zelkova serrata	Japanese zelkova*

Scientific Name	Common Name
Shrubs	
Abelia x grandiflora	glossy abelia
Acanthopanax sieboldianus	fiveleaf aralia
Amorpha fruticosa	indigobush
Aralia spinosa	devil-walkingstick
Aronia arbutifolia	red chokeberry
Aronia melanocarpa	black chokecherry
Buddleia davidii	butterfly-bush
Calycanthus floridus	sweetshrub*
Calycarpa dichotoma	purple beautyberry*
Caragana arborescens	Siberian peashrub
Caryopteris x clandonensis	blue mist shrub
Ceanothus americanus	New Jersey tea
Ceanothus ovatus	inland ceanothus
Cephalotaxus harringtonia	Japanese plum yew
Chaenomeles speciosa	flowering quince
Chionanthus virginicus	white fringetree
Cornus racemosa	gray dogwood
Corylus avellana	European hazel
Cotinus coggygria	smokebush
Cotoneaster spp.	cotoneasters (most)
Cytisus scoparius	Scotch broom
Deutzia gracilis	slender deutzia
Diervilla sessifolia	southern bush honeysuckle
Eucommia ulmoides	hardy rubber tree
Genista tinctoria	woadwaxen
Hamamelis virginiana	common witch-hazel*
Hamamelis vernalis	vernal witch-hazel*
Indigofera kirilowii	kirilow indigo
Itea virginica	Virginia sweetspire
Juniperus spp.	junipers (all)
Kerria japonica	Japanese kerria
Kolwitzia amabilis	beautybush
Lavandula angustifolia	English lavender
Ligustrum vulgare	common privet
Myrica pensylvanica	northern bayberry
Perovskia atriplicifolia	Russian sage
Physocarpus opulifolius	ninebark
Potentilla fruticosa	bush cinquefoil
Prunus x cistena	sand cherry
Prunus glandulosa	dwarf flowering almond
Prunus maritima	beach plum
Prunus tomentosa	Nanking cherry
Pyracantha coccinea	scarlet firethorn

Scientific Name	Common Name
Shrubs *(continued)*	
Rhodotypos scandens	black jetbead
Rhus aromatica	fragrant sumac
Rhus typhina	staghorn sumac
Ribes alpinum	alpine currant
Rosa spp.	roses (most)
Spiraea spp.	spireas (most)
Symphoricarpos x chenaultii	Chenault coralberry
Symphoricarpos orbiculatus	coralberry
Syringa vulgaris	common lilac*
Tamarix spp.	larches (most)
Viburnum lantana	wayfaringtree viburnum
Viburnum prunifolium	blackhaw viburnum
Viburnum rufidulum	rusty blackhaw viburnum
Yucca filamentosa	Adam's-needle yucca
Groundcovers and Vines	
Arctostaphylus uva-ursi	bearberry
Campsis radicans	trumpet vine
Celastrus scandens	American bittersweet
Clematis tangutica	golden clematis
Clematis texensis	scarlet clematis
Euonymus fortunei	wintercreeper euonymus*
Hypericum prolificum	shrubby St. Johnswort
Juniperus horizontalis	blue rug juniper
Juniperus procumbens	Japanese garden juniper
Juniperus sabina	'Tamariscifolia' tam juniper
Liriope spicata	lily turf
Lonicera japonica	Japanese honeysuckle
Lonicera sempervirens	trumpet honeysuckle
Microbiota decussata	Russian arborvitae
Parthenocissus quinquefolia	Virginia creeper
Parthenocissus tricuspidata	Boston ivy
Sedum spp.	sedum (all)
Vaccinium angustifolium	lowbush blueberry
Wisteria spp.	wisterias (most)

**This species is quite tolerant once established.*

To see other publications in this series, visit the Purdue Extension Education Store, www.the-education-store.com.

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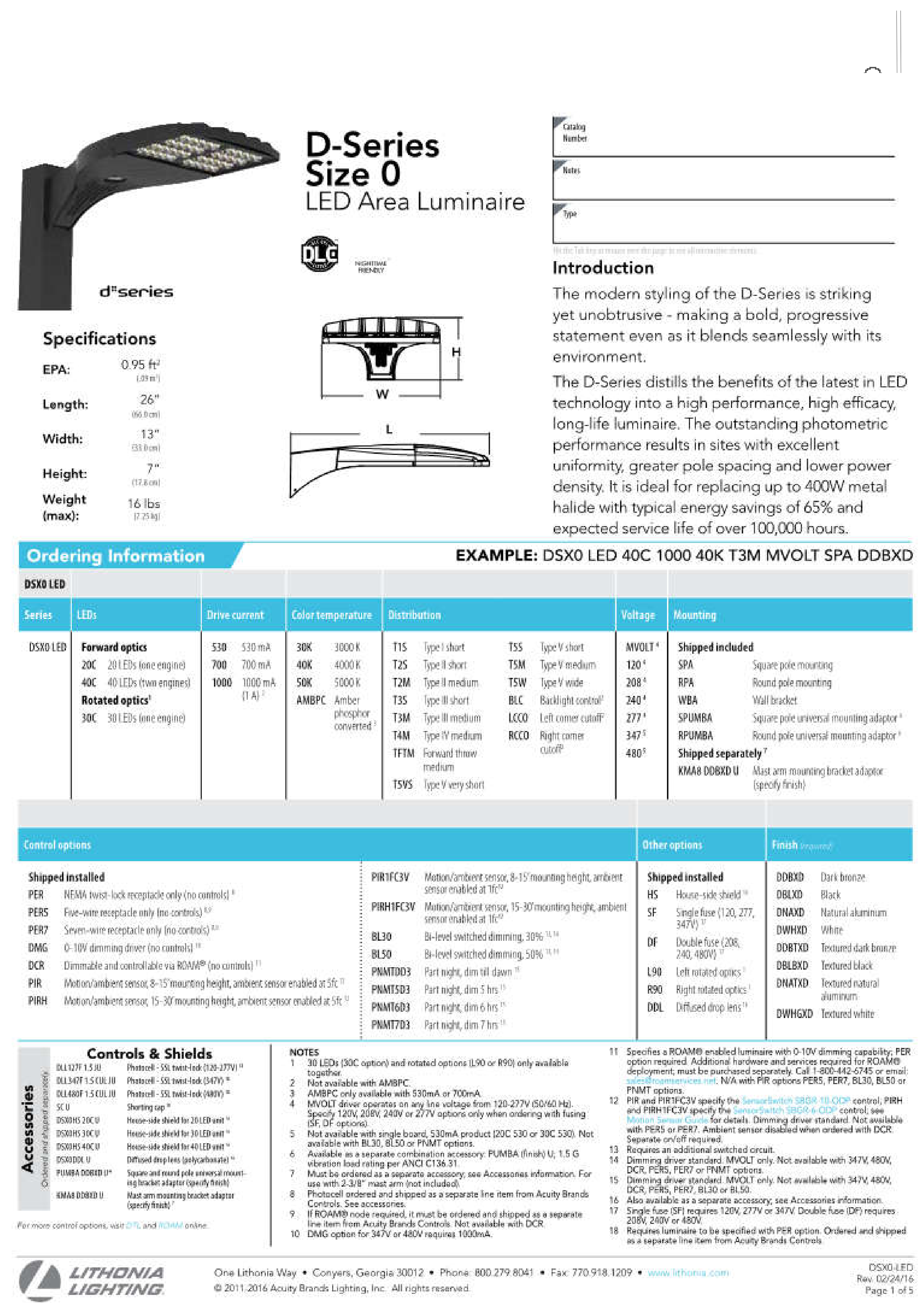
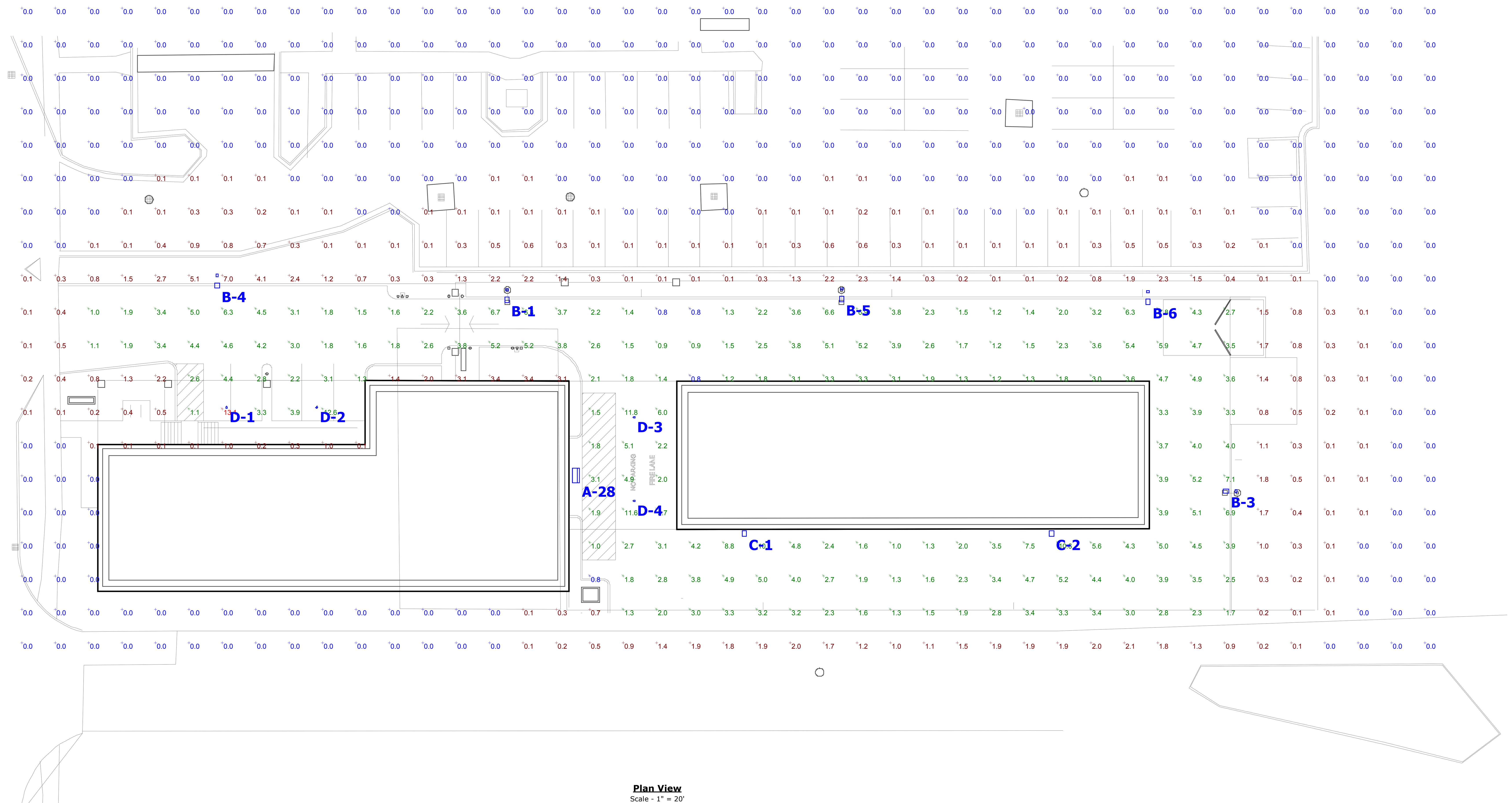
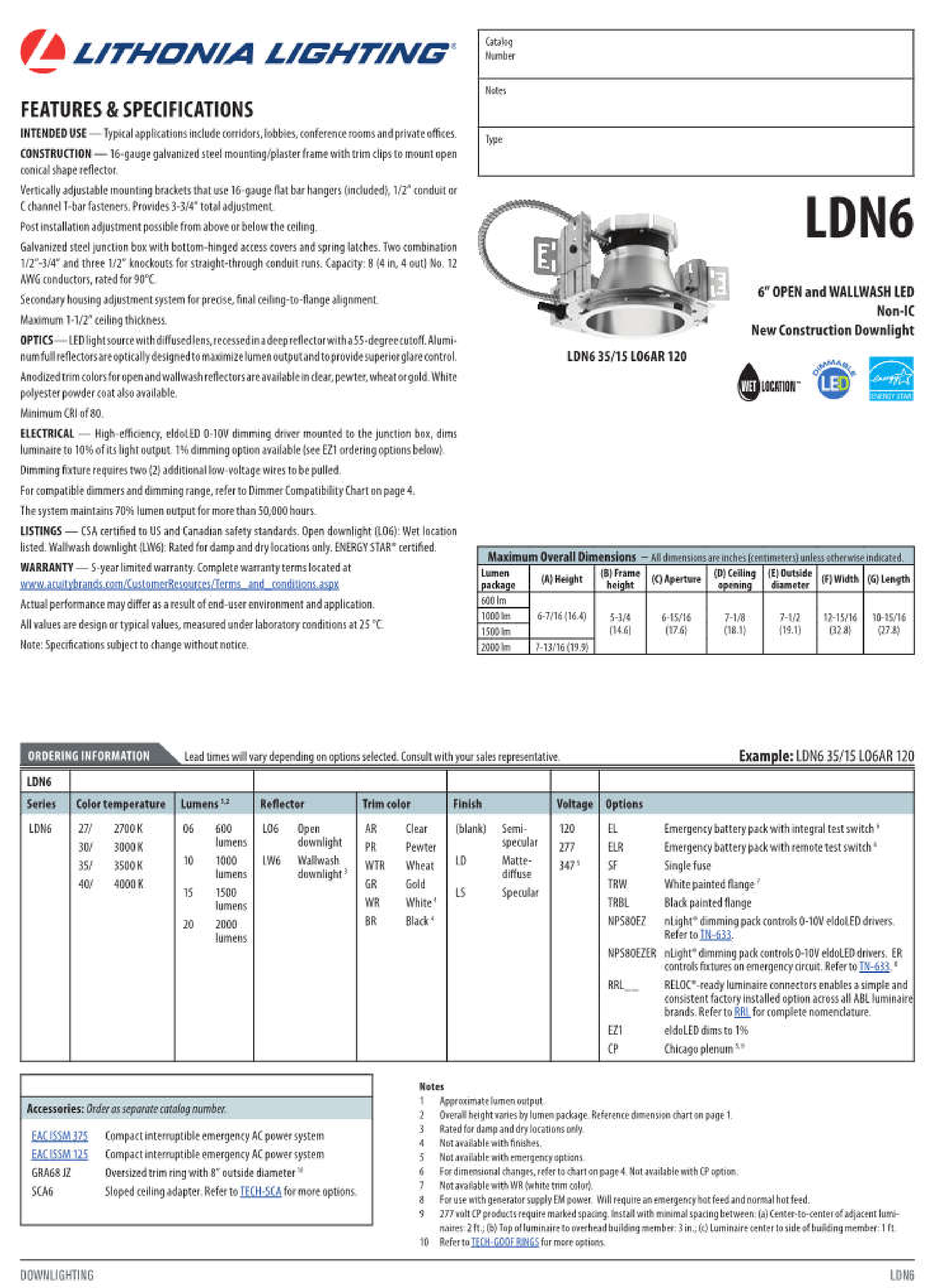
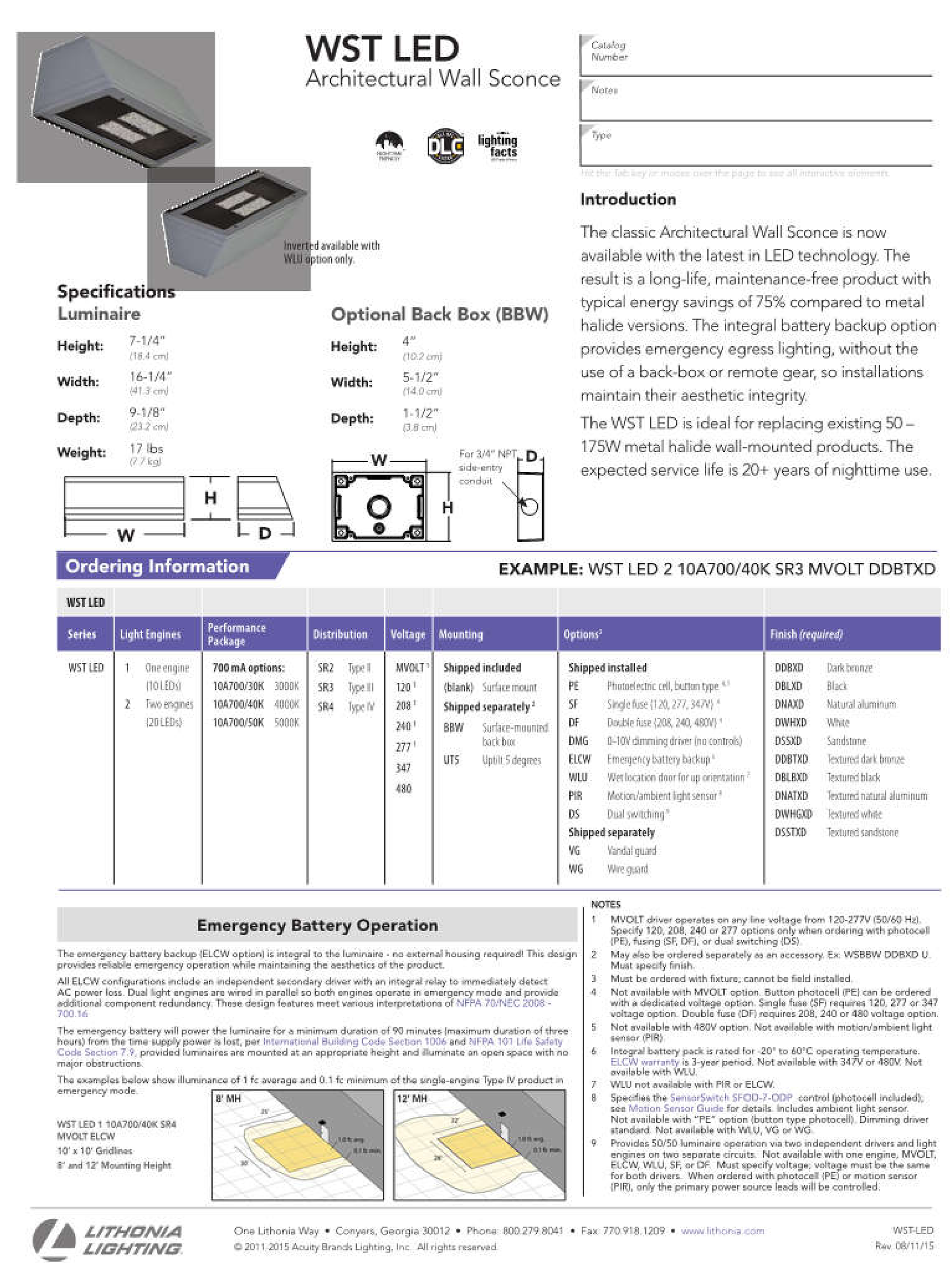
This publication was adapted from an article that appeared in the June 2010 issue of American Nurseryman.









Schedule

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	LLF	Wattage
	A	1	Lithonia Lighting	WST LED 2 10A700/50K SR4 MVOLT	WST LED WITH 1 MODULE, 20 LED's, 700mA DRIVER, 5000K COLOR TEMPERATURE, TYPE 4 LENS	LED	1	4123	0.9	47
	B	5	Lithonia Lighting	DSX0 LED 40C 1000 40K T4M MVOLT HS	DSX0 LED with 40 LEDs @1000 mA , 4000K, Type 4 Medium Optics with HOUSE-SIDE SHIELD	LED	1	11704	0.9	138
	C	2	Lithonia Lighting	DSX0 LED 40C 1000 40K T4M MVOLT	DSX0 LED with 40 LEDs @1000 mA , 4000K, Type 4 Medium Optics	LED	1	15213	0.9	138
	D	4	Lithonia Lighting	LDN6 40/20 LO6AR	2000LM 80CRI 4000k 6" LED COMMERCIAL DOWNLIGHT	LED	1	2218	0.9	35.09

Statistics

Description	Symbol	Avg	Max	Min	Avg/Min	Max/Min
OVERALL	+	1.1 fc	13.1 fc	0.0 fc	N/A	N/A
PARKING	✳	3.5 fc	13.1 fc	0.8 fc	4.4:1	16.4:1

Note

1. SEE MH COLUMN OF LUMINAIRE LOCATIONS FOR MOUNTING HEIGHTS.
2. SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTORS.
3. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT GRADE.

THE ENGINEER AND/OR ARCHITECT MUST DETERMINE APPLICABILITY OF THE LAYOUT TO EXISTING / FUTURE FIELD CONDITIONS. THIS LIGHTING LAYOUT REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRE MAY VARY DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS, AND OTHER VARIABLE FIELD CONDITIONS. MOUNTING HEIGHTS INDICATED ARE FROM GRADE AND/OR FLOOR UP.
GBA DOES NOT ACT AS THE CIVIL OR STRUCTURAL ENGINEER AND DOES NOT DETERMINE BASE REQUIREMENTS.
POLES SPECIFICATIONS ARE NOT INCLUDED WITH EXTERIOR LIGHTING PHOTOMETRIC ANALYSIS.
THESE LIGHTING CALCULATIONS ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM SUITABILITY AND SAFETY. THE ENGINEER AND/OR ARCHITECT IS RESPONSIBLE TO REVIEW FOR MICHIGAN ENERGY CODE AND LIGHTING QUALITY COMPLIANCE.

Luminaire Locations

Label	Location X	Location Y	Location Z	MH	Orientation	Tilt
A	44.46	-16.35	12.00	12.00	90.00	0.00
B	24.91	39.25	15.00	15.00	180.00	0.00
B	243.22	-21.13	15.00	15.00	270.00	0.00
B	-61.80	43.48	15.00	15.00	180.00	0.00
B	125.14	39.47	15.00	15.00	180.00	0.00
B	216.89	38.60	15.00	15.00	180.00	0.00
C	96.00	-33.00	14.00	14.00	180.00	0.00
C	188.00	-33.00	14.00	14.00	180.00	0.00
D	-59.00	4.00	12.00	12.00	0.00	0.00
D	-32.00	4.00	12.00	12.00	0.00	0.00
D	63.00	1.00	12.00	12.00	0.00	0.00
D	63.00	-24.00	12.00	12.00	0.00	0.00

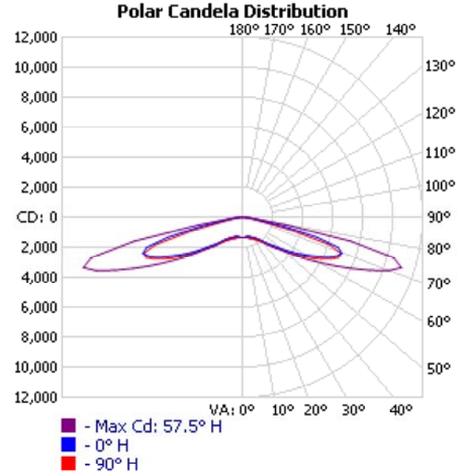
1800 SELF STORAGE
GASSER BUSH ASSOCIATES
WWW.GASSERBUSH.COM

Designer
LB/KJS
Date
5/19/2016
Scale
Not to Scale
Drawing No.
#16-55371-V3
Summary

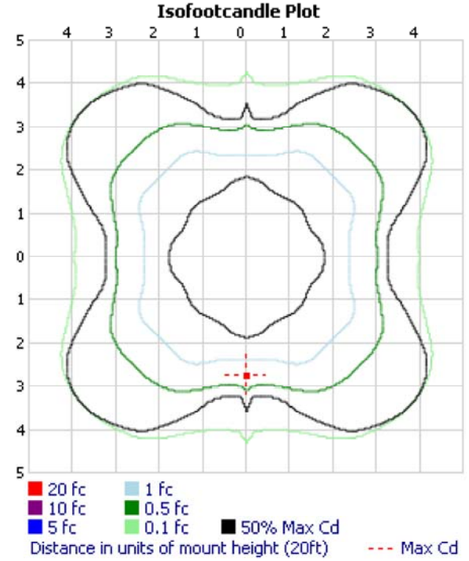
OUTDOOR PHOTOMETRIC REPORT
CATALOG: DSX1 LED 60C 1000 50K T5W MVOLT

TEST #:	LTL22430P4026
TEST LAB:	SCALED PHOTOMETRY
TEST DATE:	10/2/2012
CATALOG:	DSX1 LED 60C 1000 50K T5W MVOLT
DESCRIPTION:	DSX1 LED WITH 60 LEDS @ 1000 MA , 5000K, TYPE 5 WIDE OPTICS
SERIES:	D-SERIES AREA SIZE 1
LAMP CATALOG:	LED
LAMP:	LED
LAMP OUTPUT:	TOTAL LUMINAIRE LUMENS: 23122.2, ABSOLUTE PHOTOMETRY *
BALLAST / DRIVER:	LED DRIVER
INPUT WATTAGE:	209
LUMINOUS OPENING:	RECTANGLE (L: 14.52", W: 11.04")
Max Cd:	11,095.1 AT HORIZONTAL: 57.5°, VERTICAL: 72.5°
ROADWAY CLASS:	TYPE VS

Polar Candela Distribution



Isofootcandle Plot



*TEST BASED ON ABSOLUTE PHOTOMETRY WHERE LAMP LUMENS=LUMENS TOTAL.
*CUTOFF CLASSIFICATION AND EFFICIENCY CANNOT BE PROPERLY CALCULATED FOR ABSOLUTE PHOTOMETRY.

OUTDOOR PHOTOMETRIC REPORT
CATALOG: DSX1 LED 60C 1000 50K T5W MVOLT

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-30	1,221.0	5.3%
0-40	2,388.5	10.3%
0-60	8,559.3	37%
60-90	14,562.9	63%
70-100	7,281.3	31.5%
90-120	0	0%
0-90	23,122.2	100%
90-180	0	0%
0-180	23,122.2	100%

LUMENS PER ZONE

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	128.7	0.6%	90-100	0	0%
10-20	388.9	1.7%	100-110	0	0%
20-30	703.4	3.0%	110-120	0	0%
30-40	1,167.5	5.0%	120-130	0	0%
40-50	2,125.0	9.2%	130-140	0	0%
50-60	4,045.9	17.5%	140-150	0	0%
60-70	7,281.6	31.5%	150-160	0	0%
70-80	6,733.3	29.1%	160-170	0	0%
80-90	548.1	2.4%	170-180	0	0%

ROADWAY SUMMARY

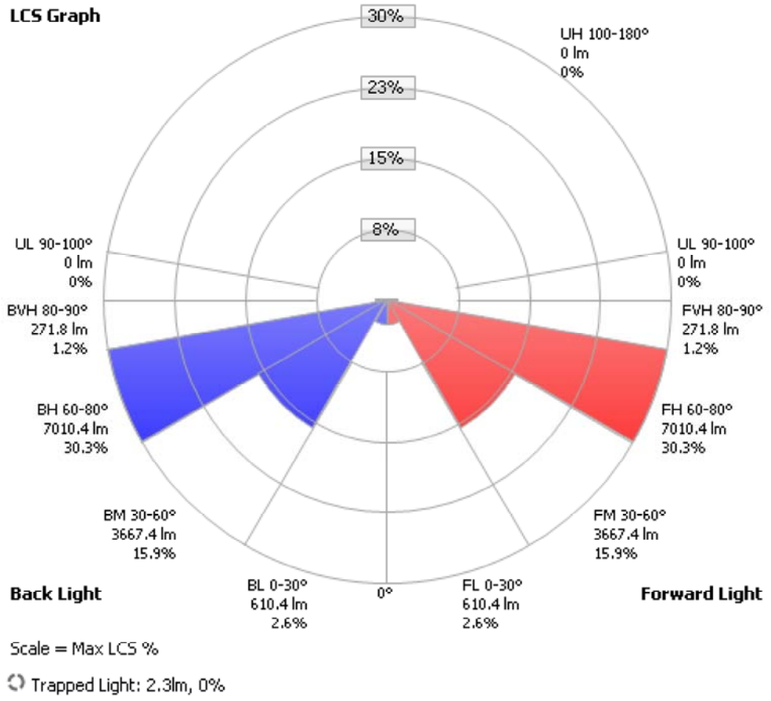
Distribution:		Type VS
Max Cd, 90 Deg Vert:		0
Max Cd, 80 to <90 Deg:		3,674.2
	Lumens	% Lamp
Downward Street Side:	11,560.0	50%
Downward House Side:	11,560.0	50%
Downward Total:	23,120.0	100%
Upward Street Side:	0	0%
Upward House Side:	0	0%
Upward Total:	0	0%
Total Lumens:	23,120.0	100%

LCS TABLE

BUG RATING	**B5 - U0 - G3**	
FORWARD LIGHT	LUMENS	LUMENS %
Low(0-30):	610.4	2.6%
Medium(30-60):	3,667.4	15.9%
High(60-80):	7,010.4	30.3%
Very High(80-90):	271.8	1.2%
BACK LIGHT		
Low(0-30):	610.4	2.6%
Medium(30-60):	3,667.4	15.9%
High(60-80):	7,010.4	30.3%
Very High(80-90):	271.8	1.2%
UPLIGHT		
Low(90-100):	0	0%
High(100-180):	0	0%
TRAPPED LIGHT:	2.3	0%

OUTDOOR PHOTOMETRIC REPORT
CATALOG: DSX1 LED 60C 1000 50K T5W MVOLT

LCS Graph



Scale = Max LCS %

Trapped Light: 2.3lm, 0%

OUTDOOR PHOTOMETRIC REPORT
CATALOG: DSX1 LED 60C 1000 50K T5W MVOLT

CANDELA TABLE - TYPE C

	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352	1352
5	1349	1341	1346	1346	1344	1346	1347	1345	1345	1346	1345	1346	1347	1346	1346	1349	1350	1352	1353
10	1335	1324	1328	1327	1326	1329	1331	1330	1330	1333	1335	1338	1340	1340	1342	1345	1345	1347	1348
15	1335	1340	1345	1343	1337	1337	1337	1333	1331	1332	1332	1334	1336	1339	1345	1349	1356	1359	1359
20	1382	1408	1411	1406	1400	1397	1398	1390	1387	1387	1382	1381	1381	1380	1383	1387	1393	1400	1402
25	1468	1494	1496	1490	1482	1480	1482	1474	1467	1468	1466	1469	1472	1476	1483	1486	1486	1484	1480
30	1587	1630	1632	1626	1618	1613	1615	1608	1602	1602	1599	1598	1602	1602	1607	1613	1628	1642	1646
35	1761	1816	1819	1814	1803	1800	1801	1797	1793	1793	1791	1787	1793	1791	1792	1799	1810	1816	1817
40	2072	2132	2140	2136	2128	2128	2138	2133	2132	2130	2131	2119	2129	2121	2122	2126	2134	2132	2130
45	2535	2579	2592	2601	2605	2623	2655	2677	2698	2714	2729	2727	2748	2752	2752	2753	2765	2762	2762
50	3145	3257	3263	3280	3276	3305	3346	3381	3409	3429	3442	3436	3453	3444	3425	3416	3422	3409	3403
55	4062	4205	4203	4227	4235	4295	4354	4432	4500	4547	4572	4556	4559	4525	4480	4453	4449	4433	4421
60	5110	5279	5288	5322	5348	5451	5566	5727	5880	6000	6075	6074	6067	5991	5913	5848	5815	5779	5769
65	6244	6391	6393	6433	6486	6635	6858	7140	7459	7730	7922	8022	8046	7955	7812	7719	7643	7592	7567
70	7052	6717	6707	6782	6898	7140	7552	8087	8699	9309	9799	10163	10342	10321	10173	10031	9935	9855	9817
75	5119	3782	3685	3712	3904	4199	4668	5354	6202	7135	8081	8885	9526	9921	10119	10270	10400	10471	10504
80	1095	760	736	745	764	818	898	1007	1144	1322	1528	1839	2195	2497	2783	3024	3268	3468	3601
85	326	219	222	246	287	316	334	356	376	383	360	322	311	319	354	417	477	488	474
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DURO-LAST® 60-MIL MEMBRANE

Advantages:
Duro-Last® 60-Mil (DL60) membrane is an excellent choice for projects requiring a long lasting, energy efficient roofing membrane. The membrane is available in prefabricated sections or as roll goods. A complete line of custom prefabricated accessories is available for the DL60 membrane.

Description:
DL60 membrane is composed of PVC film laminated to both sides of a reinforcement fabric (weft-inserted scrim).

Duro-Last membranes must not be used with Duro-Last EV membranes.

PVC Film - Proprietary thermoplastic PVC formulation of resins, plasticizers, stabilizers, biocides, flame retardants, and U.V. absorbents.

- PVC film above weft-inserted scrim – 28 mil

Weft-Inserted Scrim - An 18 x 14 polyester fabric construction with weft insertion, composed of 840 x 1000 denier threads, provides superior tear and puncture resistance. The polyester thread is treated to prevent wicking.

Total Thickness – 60 mil, nominal.

Weight – 0.36 lb. per square foot.

Colors – White, tan, gray and dark gray.

R-Value – 0.1 $ft^2 \cdot °F \cdot hr/Btu$.

Available Configurations:

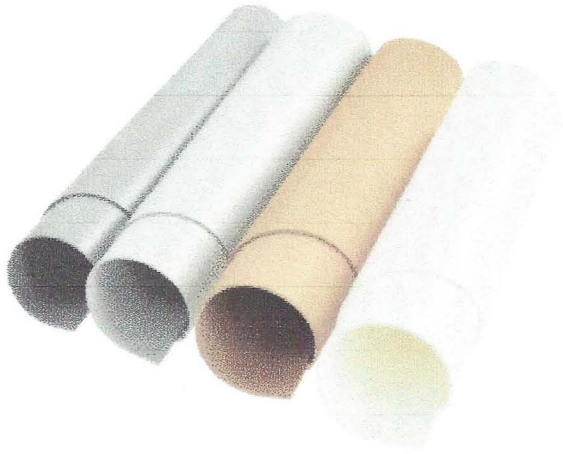
Prefabricated Sections – DL60 is available in prefabricated sections up to 1,500 sq. ft. and is rolled on a carpet tube (maximum 65 ft. wide x 23 ft. long).

Roll Good – Typical Dimensions

Width	Length (max.)	Roll Area	Approx. Weight	Approx. Coverage[1]
64 inches	100 ft.	533 sq. ft.	192 lb.	483 sq. ft.
48 inches	100 ft.	400 sq. ft.	144 lb.	350 sq. ft.
32 inches	100 ft.	267 sq. ft.	96 lb.	217 sq. ft.
16 inches	100 ft.	133 sq. ft.	48 lb.	83 sq. ft.

[1] Assuming 6-inch overlap

Energy Efficiency:
White DL60 membrane is an excellent product for complying with California Title 24, LEED® and other energy efficiency programs requiring the use of a highly reflective roof membrane. It is an ENERGY STAR® qualified product.



Cool Roof Rating Council (CRRC)[1]

	Solar Reflectance		Thermal Emittance		Solar Reflective Index (SRI)	
	Initial	3-yr	Initial	3-yr	Initial	3-yr
White	0.88	0.68	0.87	0.84	111	82
Tan	0.39	0.33	0.89	0.89	43	35
Gray	0.47	0.40	0.89	0.89	54	45
Dark Gray	0.26	0.25	0.88	0.89	26	25

[1] Duro-Last's CRRC Product ID: 0610.

LEED & LEED-EB Credits - White DL60 membrane alone can obtain 1 credit in either U.S. Green Building Council's LEED or LEED-EB programs. In combination with other design criteria the membrane may help attain other credits.

LEED Credit Category	Duro-Last Attribute
Sustainable Sites Credit 7.2 Heat Island Effect: Roof	Solar Reflective Index (SRI) SRI = 111

LEED-EB Credit Category	Duro-Last Attribute
Sustainable Sites Credit 6.2 Heat Island Effect: Roof	ENERGY STAR Qualified Thermal Emittance = 0.87

Warranty:
The following warranties are available for projects utilizing DL60 membrane. Contact Duro-Last for warranty details.

Available Warranties				
Supreme	15-YR NDL	15 + 5 Material Only[2]	15 + 5[2]	
Ultra	15-YR Hail[1]	15-YR Hail & High Wind[1]	15-YR High Wind[1]	20-YR High Wind[1]
Basic	15-YR NDL[1]		20-YR NDL[1]	
Residential	15-YR Material Only[1]		20-YR Material Only[1]	

[1] Excludes consequential damage coverage.

[2] Excludes consequential damage coverage for last 5 years.

Created: 09/01/2012 Revised: 11/13/2013, 05/28/2014, 06/05/2014, 01/23/2015, 05/18/2015, 01/22/2016, 02/15/2016