PLANNING & ZONING COMMISSION
Regular Meeting
Wednesday, September 21, 2016
6:30 p.m.

Planning and Zoning Commission

Anthony Spinelli, Chairman

Commission Members:
Ryan Kwasneski
David Maher
Jerry McGleam
Jason Sanderson
Matthew Zolecki
Ed Andrysiak

Planning & Economic Development Department Staff

Heather Valone, Planner

I. CALL TO ORDER

A. Pledge of Allegiance

B. Verify Quorum

C. Approval of Minutes August 17, 2016 meeting

II. CHAIRMAN'S COMMENTS

III. PUBLIC HEARINGS

A. 16-07 UDO Amendments continued

IV. ACTION ITEMS

V. GENERAL DISCUSSION

A. Update from Village Board

VI. AUDIENCE PARTICIPATION

VII. ADJOURNMENT

Village of Lemont
Planning and Zoning Commission
Regular Meeting of August 17, 2016

A meeting of the Planning and Zoning Commission for the Village of Lemont was held at 6:30 p.m. on Wednesday, August 17, 2016 in the second floor Board Room of the Village Hall, 418 Main Street, Lemont, Illinois.

I. CALL TO ORDER

A. Pledge of Allegiance

Chairman Spinelli called the meeting to order at 6:35 p.m. He then led the Pledge of Allegiance.

B. Verify Quorum

Upon roll call the following were:
Present: Andrysiak, Kwasneski, McGleam, Maher, Sanderson, Zolecki, Spinelli
Absent: None

Planning and Economic Development Director Charity Jones and Village Planner Heather Valone were present.

C. Approval of Minutes July 20,2016 Meeting

Commissioner Andrysiak made a motion, seconded by Commissioner Zolecki to approve the minutes from the July 20, 2016 meeting with no changes. A voice vote was taken:
Ayes: All
Nays: None
Motion passed

II. CHAIRMAN'S COMMENTS

Chairman Spinelli stated Mrs. Jones will be leaving the Village and he wished her the best of luck.

III. PUBLIC HEARINGS

A. 16-07 UDO Amendments

Chairman Spinelli said there is nobody present in the audience to swear in. He then called for a motion to open the public hearing for Case 16-07.

Commissioner Kwasneski made a motion, seconded by Commissioner McGleam to open the public hearing for Case 16-07. A voice vote was taken:
Ayes: All
Nays: None
Motion passed

Mrs. Valone stated there are a number of UDO amendments to go through. There is a definition for communication towers but it does not include some small cell equipment that has recently been introduced. She then read the new definition which is listed in staff's report.

Chairman Spinelli asked if the Village of Lemont went to fixed read antennas for the water meters would they then have to ask for a variance.

Mrs. Jones said they might to have to get a special use for that.

Commissioner Zolecki asked if there needed to be something in there to specify between private and municipality uses. He asked what if the police department wanted to put a telecommunications tower.

Mrs. Jones stated they would have to get a special use which they have done already.

Mrs. Valone said the next one is just a correction on section labeling. Next is the change to the provisions relating to the storage of campers/RVs and trailers for non-residential districts and off street parking of vehicles, buses, and trucks. The current restrictions for parking vehicles in residential districts are not clear and the restrictions are contained in two different areas. This adjustment will provide clarity and help code enforcement for enforcement. Number four is being removed in the section which was repeated in a lower section. They did replace it with "In R districts the parking of vehicles on areas of the front yard other than a driveway is prohibited".

The next section is off-street parking of Commercial vehicles, buses, trailers, trucks, construction equipment, and recreational vehicles in residential districts.

Mrs. Jones stated the first section that Mrs. Valone just went through were the general restrictions and now they are getting into the residential districts.

Mrs. Valone said the first section is prohibited vehicles. They are proposing that it is illegal to park or store the following vehicles on any lot in a residential zoning district, except when located in a garage or other fully enclosed structure that substantially conceals them from view, for more than eight consecutive hours or 12 hours within a 24-hour period.

Chairman Spinelli asked if they were striking all of 17.10.100.

Mrs. Valone stated the code that has been struck above it, that was an existing section that tried to put both the residential, commercial and industrial standards all together. It also had a number of repeated items or items that were not very clear. Staff is removing that and replacing it with these two items. So instead of having one section there will now be two. She then read all the vehicles which are restricted. For Commercial Trucks that have a "B" Plate, "there is a maximum of one commercial vehicle with a "B" license plate that is permitted to be parked on a residential lot in open view. Any other commercial vehicles with a "B" license plate shall be located in a garage or other fully enclosed structure that substantially conceals them from view". This is to allow a contractor that lives in town to have one of his vehicles in his driveway and any other ones would need to be concealed.

Chairman Spinelli asked how they are defining commercial vehicle. He asked if you have someone that has a personal truck with a "B" plate and they use that for work, but their vehicle is not marked and it has a ladder on it would it be considered work.

Mrs. Jones said this is existing language that they just organized in the code. She believes past practice with the code enforcement officer would be that it is a commercial vehicle. Even though it is owned by a person it is used for business so they are limited to one.

Chairman Spinelli asked if this was something that was complaint driven.

Mrs. Jones stated yes.

Chairman Spinelli asked if someone has their work truck with them and equipment on a trailer behind them are they allowed to park in the street overnight in a residential district.

Mrs. Jones said parking on the street is not regulated through the UDO. It is regulated through the on-street parking requirements in the municipal code. She is not sure if the municipal code differentiates between a passenger vehicle and other equipment in the street.

Chairman Spinelli stated he is not sure why they are going to restrict this on a personal driveway but they can park on the street. He would rather they park it on a personal driveway overnight rather in the street.

Mrs. Jones said these are existing regulations in place. She does know the code enforcement offices does enforce these every summer especially with boats and RV's.

Commissioner Andrysiak asked why they want to restrict RV's.

Mrs. Jones stated because they are large and considered unsightly by some people. This has been on the books before the UDO was adopted in 2008.

Commissioner Andrysiak said he could understand if the lot was small, but in the R-1 or R-2 zoning districts it should be allowed.

Mrs. Jones stated the policy of the Village is that it has to be in an enclosed structure. If this requirement was changed then they would see a lot of complaints. Some of the issue is that these larger vehicles like boats and RV's can hang over onto the sidewalk.

Discussion continued in regards to allowing boats and RV's on driveways.

Mrs. Valone said previously there was one section that combined all three commercial, industrial, and residential in one. Next is a completely new section and new number that would mostly focus on commercial regulations. The off-street parking requirements in non-residential districts allow for parking of vehicles that are prohibited in residential areas and are not associated with a permitted principal use. The code allows for a lot of vehicles that are not associated with the principal active use to be parked on the site. For example an RV cannot be stored in an open residential district, however, currently they could be stored in a shopping center parking lot. So staff is proposing the following changes. The first is boats and recreational vehicles. "In non-residential districts, it is illegal to park or store boats or recreational vehicles for more than four hours unless within a fully enclosed structure that substantially conceals them from view. The following boat and recreational vehicle parking is exempt from this requirement:

1. When attendant to an active Boat/RV sales, service, or storage use;
2. Parking or storage as permitted by 17.06.120.C.5."

Commissioner Maher asked what was the reason for four hours.

Mrs. Valone stated it was just what was previously in code and was previously being enforced.

Commissioner Maher said you are restricting someone from going somewhere in Lemont for more than four hours.

Mrs. Valone asked if the Commission preferred six or eight hours.

Commissioner Maher stated what you are trying to avoid is someone parking there overnight.

Mrs. Jones said instead of four hours they could have the words no overnight parking

Commissioner Maher stated whether it is no overnight or by 2 a.m., whatever needs to be said so they don't park overnight.

Chairman Spinelli said you can say no parking between 2 a.m. and 6 a.m.

Mrs. Valone stated for buses "in non-residential districts, it is illegal to park or store buses for more than four hours unless within a fully enclosed structure that substantially conceals them from view. The following bus parking is exempt from this requirement:

1. When the subject vehicles are school buses and they are parked on lots owned or leased by a school district; and
2. Parking or storage as permitted by 17.06.120.C.5".

Commissioner Maher said there are people who rent buses for weddings and there is a reception hall that might have a reception that is longer than four hours.

Mrs. Jones stated they could add a third exception to that use. They can call out that use and exempt it.

Chairman Spinelli asked if all of the churches are either in institutional zoning or residential zoning.

Mrs. Jones said yes, there is not a single one in commercial zoning.

Chairman Spinelli asked if this would impact the church in any way if they have a church bus.

Commissioner Maher asked about Franscian Village and their bus.

Mrs. Jones stated they will come up with something to address that.

Mrs. Valone began discussion of construction equipment parking. "In non-residential districts, it is illegal to park or store construction equipment for more than four hours unless within a fully enclosed structure that substantially conceals them from view. Parking of construction equipment engaged in work related to an active building construction or site development project occurring on the same lot on which the equipment is parked shall be exempt from this requirement. Parking or storage of construction equipment attendant to the following active principal uses shall be exempt from this requirement:

1. Construction contractor office with yard;
2. Landscaping/Nursery;
3. Lumberyard; and
4. Heavy equipment sales and service".

Chairman Spinelli stated this might be an issue for our own Public Works Department. He does not believe that Public Works are able to store all of their truck equipment in an enclosed building. He said you might have to check with the Park District and Township also.

Mrs. Jones said she will look into that.

Commissioner Maher asked if it has to fully enclosed or substantially concealed.

Mrs. Jones stated she would rather come up with some type of exemption for taxing jurisdictions.

Mrs. Valone said the next section is Truck, Tractor, and Trailer Parking in B Districts. "In B Districts, it is illegal to park or store trucks, tractors, or trailers for more than four hours unless within a fully enclosed structure that substantially conceals them from view. The following truck parking is exempt from this requirement:

1. Trucks with "B" or "D" plates owned or operated by the owner or tenant of the lot and operated for the delivery of goods or materials in support of the active principal use on the lot;
2. Parking or storage of tow trucks when such trucks are located on the same lot as, and are operated in support of, an active principal use within the Vehicle-Related Land Uses category of Table 17-06-01;
3. Parking or storage as permitted by 17.06.120.C.5; and
4. Parking of semi-trailers at designated loading docks for a period not exceed 24 hours."

Commissioner Maher asked where does a company like a plumbing company fall.

Mrs. Jones stated they would fall under number one.

Commissioner Maher said they are not delivering goods or materials.

Chairman Spinelli stated instead of specifying goods or materials it could say "operated in support of".

Mrs. Jones said that wording becomes a very ambiguous term, but they could add another exemption to specifically exempt construction contractor office uses.

Commissioner Maher asked if there was a definition for loading dock.

Mrs. Jones stated there is and she will make sure it is in there.

The next section is Truck, Tractor, and Trailer Parking in M Districts. "In M Districts, outdoor parking or storage of trucks, tractors, and trailers shall be permitted when such trucks, tractors, or trailers are operated in support of an active principle use on the lot. Such parking or storage shall be consistent with the provision of 17.06.120.C.5.

Mrs. Jones said with this one they had to use the more ambiguous language of "in support of" because the trucks might not be owned by the company. Most industrial uses need to have some type of truck traffic coming in/out of the company. 17.06.120.C.5 specifically addresses freight transportation terminals and container storage yards.

Commissioner Andrysiak asked if they could go back to prohibited vehicles. He said it should read "It is illegal to park or store the following vehicles on any lot in a residential zoning district for more than eight consecutive hours or 12 hours within a 24 hour period, except when located in a garage or other fully enclosed structure that substantially conceals them from view".

Mrs. Jones stated she will correct that.

Chairman Spinelli asked if before it went to the Village Board could it come back to them with the changes then the Commission would vote.

Mrs. Jones said that would be all right.

Mrs. Valone stated for Sidewalk Construction there is just a correction for the thickness per base. So the second to last sentence it will state, "A four-inch minimum CA-6 sidewalk base course shall be provided".

The next section is the next big section for Natural Guidelines for natural areas establishment and locational requirements for stormwater detention facilities. There was an attachment that was a very long document, which she will get to later. First they need to input it into the code as more of an appendix similar to most of the standards. The first is naturalized detentions and she then read the language. Give the authority to be incorporated in to the larger UDO document.

Chairman Spinelli asked if the Village also require or specify maintenance or does the developer have to provide a maintenance plan.

Mrs. Jones said the guidelines require a very specific maintenance plan.

Chairman Spinelli inquired about the detention basin at 131st.

Discussion continued in regards to the detention basin at the Kettering development.

Mrs. Valone said the next one is Locational Restrictions which is to prevent unsightly detention areas from being located in highly visible areas. It will state, "When detention areas contain retaining walls, such detention areas shall only be:

1. On privately owned and maintained properties;
2. In only M-Districts, B-Districts, or the R-6 District; and
3. In only the interior or rear yards."

Mrs. Jones stated there is currently a provision in UDO that says that there should not be retaining walls in detention basins but then goes on to say if there is a retaining wall. Retaining walls have been approved in detention basins regularly. They are trying to minimize the appearance of detention basins with retaining walls.

Chairman Spinelli asked if the Village has responsibility to maintain the Smith Farms detention basins.

Mrs. Jones said yes they do. It will now say that if someone wants to propose a detention basin with retaining walls that the Village is going to have to maintain, then they are going to have to come in for a variance to do so.

Commissioner Maher asked how interior yard was defined.

Mrs. Valone showed on the overhead how an interior yard was defined.

Chairman Spinelli stated he would keep it out of the corner and front yards due to public safety.

Mrs. Valone said next is vehicle related uses as permitted or special uses. There is a current use in town that falls in conflict with one of these which they are looking to change. Also there are some other unintended consequences of having some of these uses in certain zoning districts. First auto body and repair would change in Downtown Districts from a permitted use to a special use. In the downtown area it would prevent someone from putting in a new auto body shop without coming in for a special use.

Commissioner Maher asked about the existing businesses.

Mrs. Jones stated they are considered existing nonconforming. They could sell the business but could not expand without having to come in.

Mrs. Valone said the second part that would change would be auto body repairs uses being a special use to a permitted use in the M-1 Districts. Where it differs is that the downtown is pedestrian orientated and has historic character. The downtown is a bit more of a sensitive area as opposed to the M-1 Districts that are a little more suited for these types of uses.

Next is Boat, RV Sales and storage. In the B-3 District it would be a special use and in the M-1 District a permitted use. Because these types of uses are big and unsightly for the B District the Village would want them to come in for a special use. It would make it easier for these types of uses to come into the M-1 Districts.

Commissioner McGleam asked if they are sales orientated then why would they want to be in a M-1 District.

Mrs. Jones stated the use category in the code is sales, service or storage. So it could be a service and storage facility only and then an M-1 would be perfectly suited. If it is more sales orientated then they might want to be in a B-3, but they still might want to have that special use process to ensure that there aren't any incompatibilities with any other adjacent uses.

Mrs. Valone said there have been some certificate changes for outside agencies such as Cook County Highway Department and IDOT. These are certificates that go on plats and these are just updates to what the current ones are. The next one is just to change an incorrect standard to a more appropriate one. It goes back to the previous one for sidewalk construction. Two inches of base coarse is listed and it should be four so they are changing it to reflect what the code says.

Chairman Spinelli asked that whoever created the document needs to correct the scale so it matches what is shown in the middle.

Mrs. Valone stated the next one is there are no standards for street signs. Public Works has come up with a drawing and would like to put together another detail as to where they would be put up and how it will be attached.

Chairman Spinelli asked if it was ever changed or clarified as to where parkway trees can be planted in relation to street signs.

Mrs. Valone said they have not but she will look into it.

Discussion continued in regards to color, historical street signs, approval of street signs and using a sign manufacture.

Mrs. Valone stated the last change is a significant one. This would be our new Appendix H that would list all the requirements for the native planting areas. This would list what type of seeding mixes would be required, the maintenance periods, how they would maintain them, qualification contractors.

Chairman Spinelli asked who created this document.

Mrs. Valone said it was the Village Ecologist.

Chairman Spinelli asked because ecologists have varying opinions on what needs to be done, is this standardized for natural detention basins so it will be simpler.

Mrs. Jones stated it is simpler for review and for the plan development team. Also, the MWRD standards set a certain baseline but they don't really count for aesthetics. The firm that the Village uses is an ecologist but also a landscape architect so the standards are developed but they also look at the aesthetics for the community.

Mrs. Valone said staff would like to get the commission's opinion is throughout the document it lists the Village will approve. Our code typically calls out who would be approving it whether it is the Village Engineer, Planning and Economic Development Director or whatever position or sub entity would approve it. She asked in their opinion is there some items that they would be okay with the Village Ecologist approving. Just like the Village Arborist there are some things that they do approve

and there are some items the Planning and Economic Development Director could approve like landscaping requirements. Or should it be a different entity within the Village.

Mrs. Jones asked if they are comfortable relinquishing some of the approval authority to an outside contractor or would they rather it all be retained in-house with Village Staff.

Chairman Spinelli stated he would like to see a professional group reviewing it but not relinquish all approval to them. We are going to rely on them for their expertise but the Village will have the final say.

Mrs. Jones said there are certain things that the Arborist reviews and approves, but there are items that her position approves. She stated they could mirror that but they wanted to bring the question to the Commission to ask.

Chairman Spinelli stated he does not feel that you would want to relinquish all approval. The Village should still have the ability to enforce their opinion and power of it.

Commissioner Sanderson asked what does the Village Arborist approve.

Mrs. Jones said her role always has the authority to override a decision made by someone under her.

All Commissioners agreed then.

Mrs. Valone stated there are some items in there that would allow for wet detention basins. Right now the code does not allow for wet detention basins. She asked are they willing to start and look at this because of the MWRD WMO requirements. Some of these areas can be used for habitat or natural areas so are they willing to reopen that door to allowing these types of detentions.

Chairman Spinelli said with naturalized detention there are applications where you need the water. A wet detention in combination with naturalized detention should be allowed. He does not agree with a traditional wet detention basin. If they don't allow water at all then they are going to have to fix that so you can have wetland type plantings for these naturalized basins. Part of it is probably a weed area with a naturalized detention area, but you will have pockets of open water to help with the aesthetics of the facility. He feels they have to allow wet detention as part of or in conjunction with the same entire facility. He asked if this was what the document stated.

Mrs. Jones stated yes. It contemplates in allowing open water/wet detention as part of naturalized. These guidelines are if you are doing a naturalized detention facility then these are the rules that apply.

Chairman Spinelli asked if they could do either dry basin or this which will allow for open water.

Mrs. Jones said yes.

Chairman Spinelli asked if the Village will be still maintain these.

Mrs. Jones stated some yes and some no. Right now Kettering's detention basins will be the Village's responsibility. Lemont Nursing and Rehab is doing a naturalized detention basin that will be privately owned and maintained.

Discussion continued in regards to which detention basins the Village will have to maintain.

Mrs. Valone asked if there were any further questions or comments in regards to this.

Chairman Spinelli asked if they could see it after changes are made before it goes to the Village Board for approval.

Mrs. Valone stated it will go to the Committee of the Whole then back to Planning and Zoning before going for final approval with the Village Board. This way they will get comments from both Boards before final approvals.

Chairman Spinelli asked if there were any further questions or comments. None responded. He then called for a motion to continue the public hearing.

Commissioner Maher made a motion, seconded by Commissioner McGleam to continue the public hearing for Case 16-07 till the September 21, 2016 meeting. A voice vote was taken:
Ayes: All
Nays: None
Motion passed

IV. ACTION ITEMS

None

V. GENERAL DISCUSSION

A. Update from Village Board

Mrs. Valone said 23 E. Logan Street was heard by the Committee of the Whole on Monday. The Village Board opted to allow the variation with the condition that any detached garage construction on the property would need to be relocated in the rear yard of the property. Or if it was attached it would have to be a side load and would

have to be somewhere about 25 feet back from the front of the façade. The applicant had indicated at the meeting that he would be able to make this work.

Chairman Spinelli asked if it was detached would he have access from Logan.

Mrs. Valone stated yes but the garage would be located in the rear yard.

Commissioner Andrysiak asked if this would make them rethink the requirement of alley access.

Mrs. Valone said the Comprehensive Plan lists alleys as being an important area to continue to allow and nurture. Unless there is a change to the Comprehensive Plan or an amendment driven by an elected official or staff will continue to operate like as the UDO requires.

Commissioner Andrysiak stated there has not been a detached garage project in the Midwest in 10 years. He said he feels that alleys are a thing of the past.

Discussion continued in regards to detached garages and impervious coverage area.

Mrs. Valone said 13769 Main Street is another case that was previously heard by the PZC. This was a special use and variation for the truck parking site. went to the Village Board and was approved. They did incorporate all the landscaping requirements, the parking areas, no hazardous materials are permitted to be stored on the site, and no tanker trucks are permitted to be stored on the site.

Commissioner McGleam asked why it did not have to go before the COW.

Mrs. Valone stated the applicant indicated they were will to conform to all of Commissions conditions. When an applicant is not going to argue with the conditions they will sometime streamline the process and allow them to go straight to the Village Board.

VI. AUDIENCE PARTICIPATION

None

VII. ADJOURNMENT

Commissioner Maher made a motion, seconded by Commissioner Sanderson to adjourn the meeting. A voice vote was taken:
Ayes: All
Nays: None
Motion passed

Minutes prepared by Peggy Halper

TO: Planning and Zoning Commission

FROM: Heather Valone, Village Planner

SUBJECT: Case 16-07 UDO Amendments

DATE: September 5, 2016

SUMMARY

Attached is a table detailing proposed amendments to the UDO to address the provisions related to storage of campers and trailers in non-residential districts, and off street parking of vehicles, buses, and trucks. Revise the requirements for sidewalk construction, institute guidelines for natural areas establishment, and locational requirements for stormwater detention facilities. Additionally, update standards in the appendices of the UDO, zoning districts that allow vehicles related uses, and the definition of telecommunications tower. Words underlined in table are proposed additions to the text of the UDO and words ~~stricken~~ are proposed deletions. The amendments are organized by topic, rather than by chapter, to facilitate discussion. For each UDO revision, staff's rationale for amendment is provided.

BACKGROUND

The proposed amendments revise the off-street parking requirements for all districts. The following definitions are for reference when reviewing the proposed revisions:

Bus A motorized vehicle designed and constructed to be operated by a driver and carry more than nine passengers.

Construction Equipment A self-propelled motorized vehicle not designed or used primarily for the transportation of persons or property and only incidentally operated or moved over a roadway, and designed and manufactured for the roadway construction, building construction, forestry and landscaping industries. "Construction equipment" includes but is not limited to: skid loaders, bucket loaders, ditchers, excavators, forklifts, backhoes, dozers, and commercial lawn care equipment. The term does not include equipment designed for personal residential use such as riding lawn mowers and snow blowers.

Recreational Vehicle (RV) Any building, structure, or vehicle designed and/or used for living, sleeping, or recreational purposes and equipped with wheels to facilitate movement and including pick-up coaches, campers, motorized homes, boats, trailers, and camping trailers not meeting the federal specifications required for manufactured home or mobile home.

Tractor A motorized vehicle designed and constructed to pull other vehicles, including, but not limited to trailers, semi-trailers, farm equipment or construction equipment.

Trailer A trailer is:

1. A vehicle so designed and constructed as to not move under its own power, but rather to be pulled by a powered vehicle such as an automobile, bus, tractor or truck. This definition of "trailer" also includes "semi-trailer." A "semi-trailer" is a type of trailer without a front axle and/or where a portion of the weight of the trailer is supported by a dolly, landing gear apparatus, tail of another trailer, or by the fifth wheel or other portion of a tractor; or

2. Any vehicle or portable structure constructed so as to permit occupancy thereof for lodging or dwelling purposes or for the use as an accessory building or structure in the conduct of business, trade, or occupation.

Government Facility A structure or land use operated by the federal, state, or local government or by a local taxing body, e.g. Lemont Township, for the accomplishment of government services.

TOPIC: Definitions Telecommunications Tower	Reason for Change
Chapter 17.02 DEFINITIONS **Telecommunications Tower.** A tower, pole, or similar structure that supports a telecommunications antenna in a fixed location, freestanding, guyed, or on a building or other structure. This definition also included structures supporting such equipment, ~~and~~ attendant parking~~.~~, and small cell antenna structures. Small cell antenna structures includes an antenna, a structure designed to specifically support an antenna, and/or and appurtenances mounted on such a structure or antenna which is used or designed to be used, to provide wireless transmission of voice, data, images, or other information.	The current definition of telecommunications tower does not include the small cell equipment that is a recently introduced telecommunications design.

TOPIC: Correction of section labeling	Reason for Change
17.04.040 Public Hearing and Approval **A. Record of Testimony.** The review body or person responsible for conducting public hearings on the applications required under this ordinance shall make an accurate and complete record of all testimony and exhibits presented during the hearing. The Planning and Economic Development Director shall provide staff support for this responsibility. **B. Findings of Fact.** After conclusion of the public hearing, the hearing body or person shall prepare a recommendation including findings of fact based on a review of the hearing record. The Planning and Economic Development Director shall provide staff support for this responsibility. **C. Continuance of Public Hearings.** At the discretion of the hearing body or person, a public hearing may be continued. For public notice requirements in conjunction with continuances, see § 17.04.050 of this ordinance. **D. Relay to Village Board.** The Planning and Economic Development Director shall relay the recommendation and findings of the hearing body or person to the Village Board without delay. **~~G~~E. Village Board Action.** The Village Board shall act on the application within 90 days following the receipt of the recommendation of the hearing body or person, unless the petitioner agrees to an extension. The Village Board	The labeling of these sections is simply a scrivener's error.

may grant or deny the application or grant with modification, or may refer the application back to the hearing body for further consideration. ~~H~~**F. Costs.** The applicant shall be responsible for the Village's costs associated with the public hearing, including public notice, consultant fees, recordation and preparation of the public hearing record, and services of a court reporter. In order to ensure payment, the Planning & Economic Development Department shall require the establishment of an escrow account prior to the public hearing. The escrow amount shall be based on anticipated costs associated with the application. Action on the application may be withheld pending establishment of the account or reimbursement of Village costs associated with the public hearing. The escrow account requirement may be waived by the Planning and Economic Development Director.	
17.04.140.D Conditions for Special Use Approval. The Planning and Zoning Commission may recommend and the Village Board may provide such conditions and restrictions upon the construction, location, and operation of a special use as may be deemed necessary to promote the objectives of this ordinance or mitigate potential adverse impacts of the special use. In the event that the Planning and Zoning Commission does not recommend approval of the special use, a favorable vote of two-thirds of all the Trustees of the Village Board then holding office shall be required for the approval of the special use.	The Illinois Municipal Code requires that if the PZC does not recommend approval of a variation to the Village Board only a two-thirds majority of the Trustees currently holding office must vote favorably to approve the variation. As Lemont is not Home Rule the code must be revised.
17.04.150.D.3. Standards for Variations. The Planning and Zoning Commission or the Zoning Hearing Officer may recommend and the Village Board may require such conditions and restrictions upon the subject property as may be necessary to comply with the intent and standards as set forth in this section. In the event that the Planning and Zoning Commission does not recommend approval of the variation, ~~a super majority of the Village Board~~ a favorable vote of two-thirds of all the Trustees of the Village Board shall be required for the approval of the variation. In the event that either the Zoning Hearing Officer does not recommend approval of the variation, a simple majority of the Village Board shall be required for the approval of the variation.	The Illinois Municipal Code requires that if the PZC does not recommend approval of a special use to the Village Board only a two-thirds majority of the Trustees must vote favorably to approve the special use. As Lemont is not Home Rule the code must be revised.

TOPIC: Change the provisions relating to storage of campers/RVs and trailers for non-residential districts and off street parking of vehicles, buses, and trucks.	Reason for Change
D. Restrictions 1. Unenclosed off-street parking spaces shall not be used for the repair, dismantling or servicing of any vehicles, equipment, materials, or supplies. 2. Inoperable vehicles shall not be parked or stored in unenclosed parking areas. 3. ~~T~~In R districts, the parking of vehicles on areas of the front yard other than a driveway is prohibited. 4. ~~Trucks and other commercial vehicles with "C" through "Z" license plates, trailers, recreational vehicles, construction equipment, tractors and boats shall not be permitted to park or be stored in any residential district except when located in a garage that substantially conceals them from view. Temporary parking on driveways in residential lots is permitted for a maximum of eight consecutive hours or 12 hours within a 24-hour period. A limit of one commercial vehicle with a "B" license plate is permitted to be parked on a residential lot.~~ **17.10.100 Off-Street Parking of Commercial Vehicles, Buses, Trailers, Trucks, Construction Equipment, and Recreational Vehicles in Residential Districts** ~~A. It is illegal to park or store the vehicles listed in this paragraph A on any lot in a nonresidential zoning district, except when located in a garage or other fully enclosed structure that substantially conceals them from view, for more than four consecutive hours:~~	The current restrictions for parking vehicles in residential districts are not clear and the restrictions are contained in two different areas in the chapter. This adjustment will provide clarity.

~~1. Trailer.~~ ~~2. Tractor.~~ ~~3. Trucks and other commercial vehicles with "C" through "Z" license plates, or the equivalent thereof issued by any jurisdiction.~~ ~~4. Bus.~~ ~~5. Construction equipment.~~ ~~6. Any class of commercial motor vehicle where, in order to be lawfully operated, the operator must possess a valid commercial driver's license.~~ ~~B. It shall be unlawful for a property owner to allow the parking on his/her lot for more than four consecutive hours any of the vehicles listed in paragraph A of this section.~~ ~~C. The parking of vehicles listed in paragraph A of this section shall be allowed:~~ ~~1. When the property owner or the tenant of a shopping center consents to the parking of said vehicles in areas clearly designated, marked and used for off-street loading zones on lots that contain an active principal use; or~~ ~~2. When the subject lot is within an M district which contains an active principal use; or~~ ~~3. When the subject vehicle is engaged in work related to an active building construction or site development project occurring on the lot; or~~ ~~4. When the subject vehicle is owned or operated by the owner of the lot or a tenant of the lot; or~~ ~~5. When the subject vehicle is engaged in the~~	

~~delivery of goods or materials for a tenant on the lot; or~~

6. ~~When the subject vehicles are school buses and they are parked on lots owned or leased by a school district; or~~

7. ~~When the primary or accessory use of the lot or a business on the lot is truck, trailer, or construction equipment rental or sales and service.~~

A. Prohibited Vehicles. It is illegal to park or store the following vehicles on any lot in a residential zoning district for more than eight consecutive hours or 12 hours within a 24-hour period, except when located in a garage or other fully enclosed structure that substantially conceals them from view:

1. Trucks and other commercial vehicles with "D" through "Z" license plates, or the equivalent thereof issued by any jurisdiction;

2. Recreational Vehicles;

3. Construction Equipment;

4. Buses;

5. Trailers;

6. Tractors; and

7. Boats.

B. Commercial Trucks, "B" Plate. A maximum of one commercial vehicle with a "B" license plate is permitted to be parked on a residential lot in open view. Any other commercial vehicles with a "B" license plate shall be located in a garage or other fully enclosed structure that substantially conceals

them from view. **17.10.110 Off-Street Parking of Commercial Vehicles, Buses, Trailers, Trucks, Construction Equipment, and Recreational Vehicles in Non-residential Districts** **A. Boats and Recreation Vehicles.** In non-residential districts, it is illegal to park or store boats or recreational vehicles between the hours of 2:00 am and 6:00 am unless within a fully enclosed structure that substantially conceals them from view. The following boat and recreational vehicle parking is exempt from this requirement: 1. When attendant to an active Boat/RV sales, service, or storage use; and 2. Parking or storage as permitted by 17.06.120.C.5. **B. Buses**. In non-residential districts, it is illegal to park or store buses for more than four hours unless within a fully enclosed structure that substantially conceals them from view. The following bus parking is exempt from this requirement: 1. Parking or storage of buses attendant to the following active principal uses: a. Banquet Hall; b. Religious Assembly; c. Religious Institution; and d. Government Facility; 2. When the subject vehicles are school buses and they are parked on lots owned or leased by a school district; and	Off-street parking requirements in non-residential districts allow for parking of vehicles that are prohibited in residential areas and are not associated with a permitted principal use. For example RVs cannot be stored in open air in residential district; however, currently they could be stored in a shopping center parking lot.

3. Parking or storage as permitted by 17.06.120.C.5.

C. Construction Equipment. In non-residential districts, it is illegal to park or store construction equipment for more than four hours unless within a fully enclosed structure that substantially conceals them from view. Parking of construction equipment engaged in work related to an active building construction or site development project occurring on the same lot on which the equipment is parked shall be exempt from this requirement. Parking or storage as permitted by 17.06.120.C.5. Parking or storage of construction equipment attendant to the following active principal uses shall be exempt from this requirement:

1. Construction Contractor Office with Yard;

2. Landscaping / Nursery;

3. Lumberyard;

4. Heavy Equipment Sales and Service; and

5. Government Facility.

D. Truck, Tractor, and Trailer Parking in B Districts. In B Districts, it is illegal to park or store trucks, tractors, or trailers for more than four hours unless within a fully enclosed structure that substantially conceals them from view. The following truck parking is exempt from this requirement:

1.Trucks with "B" or "D" plates owned or operated by the owner or tenant of the lot and operated for the delivery of goods or materials in support of the active principal use on the lot;

2. Parking or storage of trucks attendant to the following active principal uses:

a. Construction Contractor Office;

b. Construction Contractor Office with Yard; c. Landscaping / Nursery; d. Lumberyard; e. Heavy Equipment Sales and Service; and f. Government Facility. 3.Parking or storage of tow trucks when such trucks are located on the same lot as, and are operated in support of, an active principal use within the Vehicle-Related Land Uses category of Table 17-06-01; 4. Parking or storage as permitted by 17.06.120.C.5.; and 5. Parking of semi-trailers at designated loading docks for a period not to exceed 24 hours. **C. Truck, Tractor, and Trailer Parking in M Districts.** In M Districts, outdoor parking or storage of trucks, tractors, and trailers shall be permitted when such trucks, tractors, or trailers are operated in support of an active principal use on the lot. Such parking or storage shall also be consistent with the provisions of 17.06.120.C.5.	
TOPIC: Sidewalk construction	**Reason for Change**
17.26.110.K2 Installation Requirements For base preparation, a four-inch minimum of CA-6 curb base course shall be provided. The base course shall be trimmed or filled as necessary to provide a full depth of curb and gutter as shown in detail LS-2 of this chapter. (Detail sheets are found at the end of this chapter.) Prior to the concrete placement, in accordance with the testing and acceptance requirements indicated below. A ~~two~~ four-inch minimum CA-6 sidewalk base course shall be provided. Sidewalk subgrade shall be tamped or rolled until thoroughly compacted.	The section indicates the incorrect standard for a sidewalk base course.

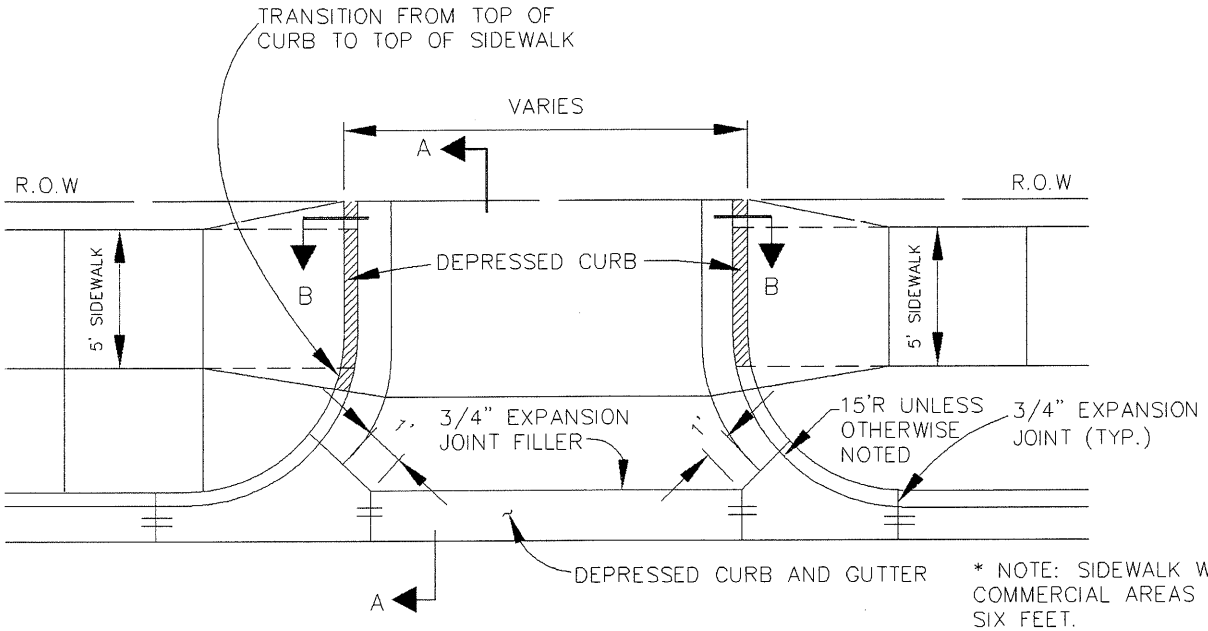
TOPIC: Natural Guidelines for natural areas establishment and locational requirements for stormwater detention facilities	Reason for Change
17.29.020 Design Standards **G. Naturalized Detention** Naturalized detention basins are encouraged. Naturalized detention is intended to serve multiple functions in addition to flood prevention, including to pollutant removal and creation of wildlife habitat (where appropriate). ~~Naturalized detention shall:~~ The design and installation of naturalized detention facilities shall comply with the standards found in Appendix H titled "Native Plantings Guideline" adopted here in and are incorporated by reference. ~~1. Use exclusively plans that are native to Illinois or the Midwest; and~~ 2. ~~Be used in conjunction with a detailed planting schedule, including provisions for a two-year installation and plant establishment period, and provisions for stewardship of the basin.~~	The UDO currently allows for naturalized detention basins; however, there are few specific requirements and it does not provide enough information for users to understand/ deign these basins and areas. Additionally the standards outlined in the proposed Appendix H are designed to achieve requirements from MWRD's WMO.
K. Locational Restrictions When Detentions areas containing retaining walls, such detention areas shall only be: 1. On privately owned and maintained properties; 2. In only M-districts, B-districts, or the R-6 district; and 3. In only the interior side or rear yards.	These restrictions prevent unsightly detention areas from being located in highly visible areas.

TOPIC: Vehicle related uses as permitted or special uses	Reason for Change
Table 17.06.01 Permitted and Special Uses in the Zoning Districts Auto body and repair: change Downtown district from permitted use to a special use and change M-1 from a special use to a permitted use.	Restricting auto body and repair in the downtown is to ensure additional administrative review of this use as the Downtown District contains a number of historic buildings and because the intended purpose of the DD is to serve as a pedestrian oriented retail/entertainment mixed use district. Auto body shops may have certain incompatibilities with achieving the intended purpose of the DD.
Boat/RV sales, service, or storage- alter B-3 district to a special use and M-1 as a permitted use.	These larger recreational vehicles and boats have a significant impact on the appearance of the site. Thus in commercial districts they should be special uses to allow for administrative review and additional screening on these sites. Allowing this use in the M-1 district is more suitable as the M-districts are not highly visible commercial areas.
TOPIC: IDOT and Cook County Highway Department Plat Certificates	**Reason for Change**
Appendix D Certificates for Plats D-16 Cook County Highway Cook County Department of Transportation and Highways Certificate The following certificate relates to the Cook County Department of Transportation and Highways entrance permit number _____ STATE OF ILLINOIS))SS COUNTY OF COOK)	Both Cook County Highway Department and IDOT have revised their plat certificates, thus the UDO must be updated accordingly.

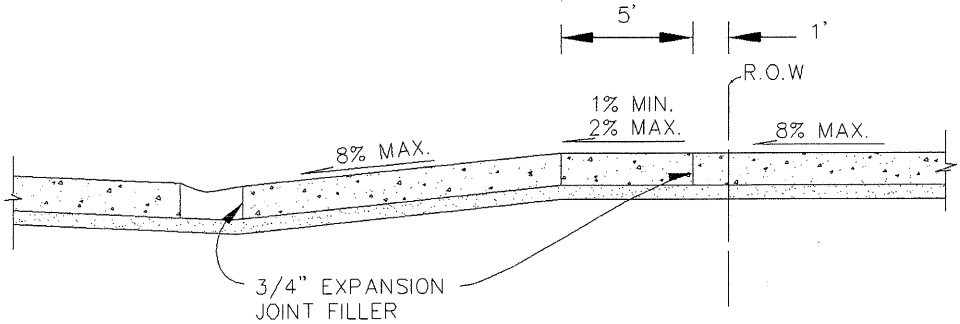
This plat has been approved by the Cook County Department of Transpiration and Highways with respect to roadway access pursuant to 765 ILCS 205/2. However, a Highway Permit conforming to the standards of Cook County Department of Transportation and Highways is required by the owner of the property for this access. ____day of _____,_____ _____ Superintendent of Transportation and Highways Cook County, Illinois D-18 State of Illinois Highway This plat has been approved by the Illinois Department of Transportation with respect to roadway access pursuant of §2 of "An Act to revise the law in relation to plats," as amended. A plan that meets the requirements contained in the Department's "Policy on Permits for Access Driveways to State Highways" will _____ John A. Fortmann, P.E. Deputy Director of Highways Region One Engineer	
TOPIC: Sidewalk construction	**Reason for Change**
Appendix G LS-5 Driveway Aprons and Alley Returns (See Attachment A) **LS-94 Street Sign** (See Attachment B)	As stated previously the incorrect standard for a sidewalk base course are indicated. Currently the UDO does not contain standards for street signs.

TOPIC: Naturalize Areas Establishment Guide	Reason for Change
Appendix H Native Planting Guideline (See Attachment C)	The UDO currently allows for naturalized detention basins; however, there are few specific requirements and it does not provide enough information for users to understand/ deign these basins and areas. Additionally the standards outlined in the proposed Appendix H are designed to achieve requirements from MWRD's WMO.

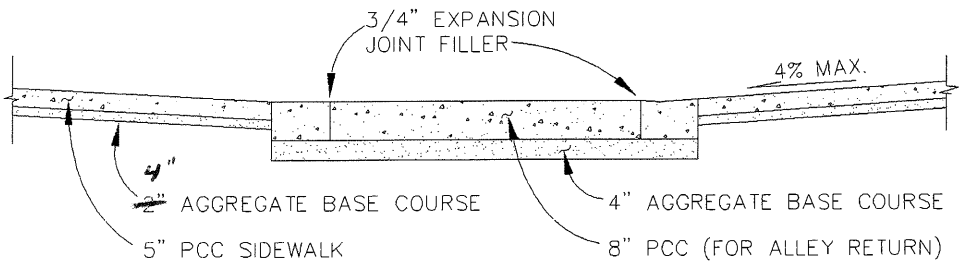
Attachment A



TYPICAL DRIVEWAY APRON AND ALLEY RETURN



SECTION A–A



SECTION B–B

* SEE STANDARD LS 6 RESIDENTIAL FOR DRIVEWAY PAVEMENT COMPOSITION

VILLAGE OF LEMONT		
DRIVEWAY APRONS AND ALLEY RETURNS		
12/10/01	NO. LS–5	REV. 2

Attachment B

Village of Lemont street sign specifications

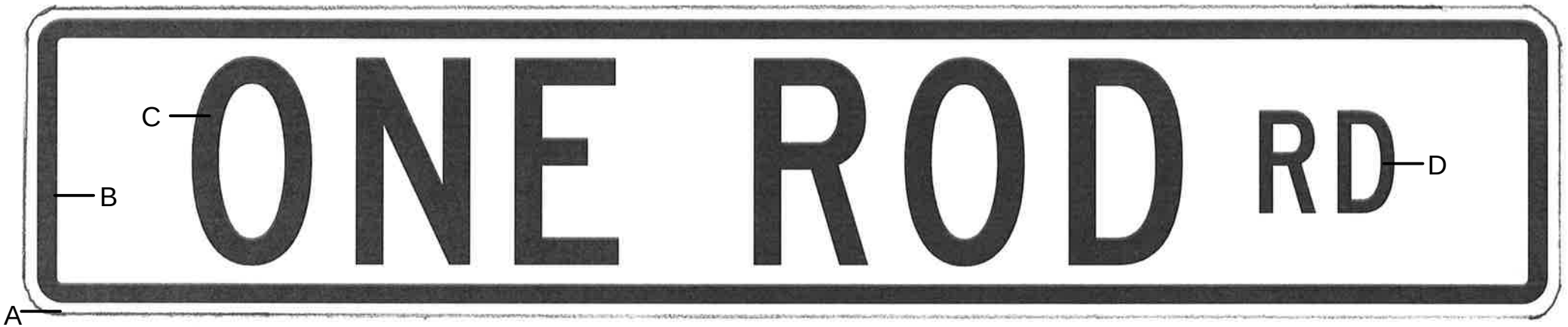
Sign size can be 6"x24", 6"x30", 6"x36" (size should be proportionate to street name)

Background material: High intensity grade prismatic reflective sheeting in white.

Letters and inside border are vinyl in black.

Sign blank is made of flat sheet aluminum .100 gauge.

All letters are in CAPS



A - Outside border = 1/4"

B - Inside border = 3/8"

C = Street name letters = 4"

D - Street type letters = 2"

Attachment C

VILLAGE OF LEMONT

Native Planting Guidelines

A resource for developers and residents who wish to incorporate native plantings into their property.

Village of Lemont
630-257-1550

To download a full copy of this guideline visit:
www.lemont.il.us

Purpose of the **NATIVE PLANTING** Guidelines

The Native Planting Guidelines are a resource for developers and residents who wish to establish native plantings on their properties. The document has been developed by the Village of Lemont in consultation with professional ecological restoration practitioners using insight and practical knowledge regarding the design, implementation, and management of native plant communities and their associated ecosystems. They are intended to provide:

Education of Developers & Residents – Native plantings are not traditional landscapes — their design, installation, and maintenance follow scientific processes and can be complicated — they require understanding and patience. This document will inform individuals on why native plantings are important, set realistic expectations during their development, and present best practices for designing, installing, and maintaining them. It will also outline and discuss monitoring efforts that are critical to the successful establishment of native plantings.

Efficiency in Review - BBy providing these guidelines, the Village of Lemont is setting a minimum standard for the design, installation, and management of natural areas and native plantings whenever used throughout the Village. This will lead to a more consistent plan review process for developers and sets basic expectations for native plantings consistent with the intent of the current landscape ordinance. The goal is to set realistic expectations, reduce plan review costs, and improve the environment in an aesthetically positive way.

Higher Quality Natural Areas – Native planting areas that are constructed with a knowledgeable and comprehensive plan for installation and management are much more valuable to the owners and to the community. This guideline provides developers and residents proven methodology regarding the establishment and ongoing management of high quality native plantings that provide long-term functionality with positive aesthetics.

More Natural Areas - All Village residents benefit when degraded natural areas are restored to good health and when underutilized open space is converted to native plants. The Village encourages developers and residents to implement native plantings wherever possible. The Native Planting Guideline provides a knowledge base that will help get projects off the ground.

Why Use Native Plants?

Plants are one of the only organisms on earth that can convert the sun's energy into a form of energy the rest of the planet can use and are the basis of most life on Earth. However, many of our native insects cannot eat plants that have been introduced from Asia or Europe and therefore rely on our native plants in order to survive. The remaining food chain relies on this interaction. Native plants form the foundation of our Midwestern ecosystem. They are uniquely American!

NOT LANDSCAPING
There is an entire industry focused on the design installation and maintenance of native plantings. Make sure you hire qualified help.

AESTHETICS MATTER
When designed, installed, and maintained correctly, native plantingslook good and add significant value to our community.

TIMING IS EVERYTHING
Native plantings can take three to five years to fully establish and begin flowering. Patience and diligence is required. It's worth the wait!

IT'S NOT MAINTENANCE FREE
Often native plantings are wrongly touted as "maintenance free." Once established they are low maintenance but do require care in perpetuity.

VALUE NATURE
Take time to learn about the many benefits native plants provide to our environment. Once they become valued, acceptance often follows.

EDUCATE YOUR NEIGHBORS
Don't let your knowledge about native plants end here. Continue to learn and talk with your neighbors to help them understand their value.

SHARE YOUR STORY
Too often we hear about the "weed patches"instead of the good plantings. When you've attained success by following these guidelines, share your story!

CONTENTS:

SECTION 1
Natural Areas Applications

SECTION 2
Design Criteria

SECTION 3
Construction & Planting Guidelines

SECTION 4
Maintenance Guidelines

SECTION 5
Performance Criteria & Monitoring

APPENDICES
A: Native Seed and Plant Mixes
B: Contact Information for Local Professional Natural Areas Contractors
C: Contact Information for Regional Native Plant & Seed Suppliers
D: Invasive Species List
E: Submittal Checklist
F: Examples of Installations
G: Hydrograph Information
H: References & Additional Information
I: Glossary

Using the Guidelines and Enforcement

This document is to be used as a supplement to the established codes and ordinances of the Village of Lemont. The Village encourages the use of native plantings by residents and developers. Whenever native planting projects subject to Village codes and ordinances are implemented this document shall be utilized as the minimum acceptable standard. Native plantings not conforming to this guideline may be subject to the same enforcement tools as outlined in the Village's Landscape Ordinance.

SECTION 1

APPLICATIONS FOR NATIVE PLANTINGS

Native plantings provide numerous benefits for your property, your neighborhood, and the larger community. This section will outline which applications are best suited for the incorporation of native plantings and how they can deliver ideal solutions to common development challenges.

VILLAGE OF LEMONT

1.01 Stormwater Management

Historically, when rain fell on the virgin prairies and forested land in Illinois the water soaked into the soft rich soils (referred to as "pervious" surfaces) and emerged slowly into wetlands, creeks, and rivers as cool, clean groundwater. As humans began to alter the landscape through the construction of buildings, roads, and compacted lawns (referred to as "impervious" surfaces), larger and larger amounts of rain water would be diverted directly into water bodies at increasingly rapid rates resulting in regularly occurring localized and downstream flooding (Figure 1-2). In response to human-induced flooding, engineers began to address it by implementing stormwater management techniques into new development. These techniques centered on the temporary impoundment of rainwater in a basin or pond and using an appropriately-sized pipe to release the water downstream at a much slower rate than it would have moved off site without the basin in place. See Figures 1-3 and 1-4 for a diagram of the two types of basins and how they work. This approach to stormwater management has proven effective in reducing the frequency and severity of flood events, however in recent years the focus has shifted to improving the quality of the water moving off site in addition to controlling the quantity of water.

It is important for residents and developers to understand that the overwhelming majority of "ponds" within the Village of Lemont are actually "retention basins" and are part of a stormwater management system.

A tool used by engineers to predict and document the volume of water and the duration of its presence is a storm hydrograph. Hydrographs communicate the normal water level and the peak levels during particular storm events. See Appendix G for further explanation of hydrographs.

These water quality techniques are referred to as "Best Management Practices" (BMPs) and can be defined as environmentally-positive and effective stormwater treatment techniques to promote water infiltration into the soil and improve overall water quality. To achieve this, these systems rely on specialized soils, plants, and/or natural processes (naturally occurring bacteria and fungi in productive soils) to provide erosion control and reduce sedimentation, to remove nutrients from the water, and to create pervious surfaces that soak more water into the ground rather than allowing it to flow off the site. Most BMPs are designed to capture, filter, and treat the low intensity, high frequency rain events and/or the "first flush," which is typically the first ½" of any carrying a majority of the pollutants washed away from roads and lawns.

The integration of native plants into BMPs dramatically improves their effectiveness. Roots of native plants reach deep into soil (sometimes upwards of fifteen feet, see Figure 1-1) and each year approximately 25% of their root system dies off and becomes organic matter. When the roots decay they leave porous holes or tunnels which aerate the soil, provide steady soil drainage, and increase the soil's ability to absorb and hold water. The main result is that more stormwater is cleaned by natural processes and percolates through the soil. When compared to native plants, turf grass provides a fraction of the root mass (4-6" deep) and will not provide the multiple benefits afforded by native plants.

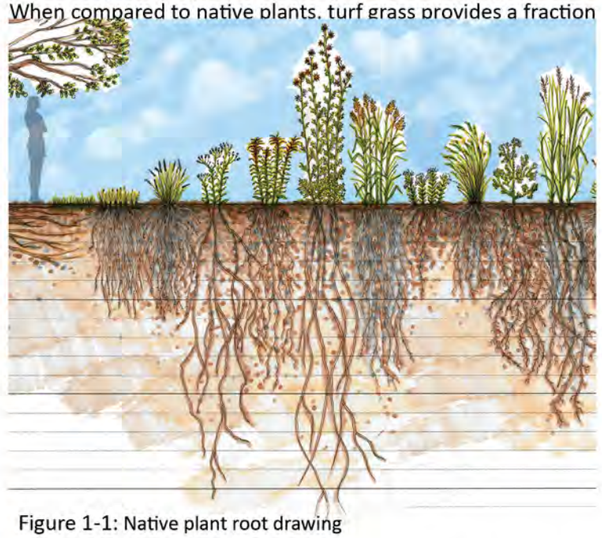


Figure 1-1: Native plant root drawing

Following is a description of some common BMPs for water quality improvement and how native plantings improve their function:

1.01.01 Naturalized Stormwater Basins

A. **Erosion Control -** Since their inception in the 1970s, stormwater basins have typically been planted with turf grass. It was quickly realized that turf grass was not suited to grow in wet soil conditions and the shallow root systems could not adequately withstand the erosive forces of water and ice which commonly give way to significant soil erosion (Figure 1-5). The traditional response to shoreline erosion is to install stone along the water's edge. This is both an expensive and temporary application as stone requires its own level of maintenance, repairs, and replacement over time (Figure 1-6). Alternatively, installing the appropriate native plants that evolved in a wet soil condition and have extensive, deep root systems lock shoreline soils in place.

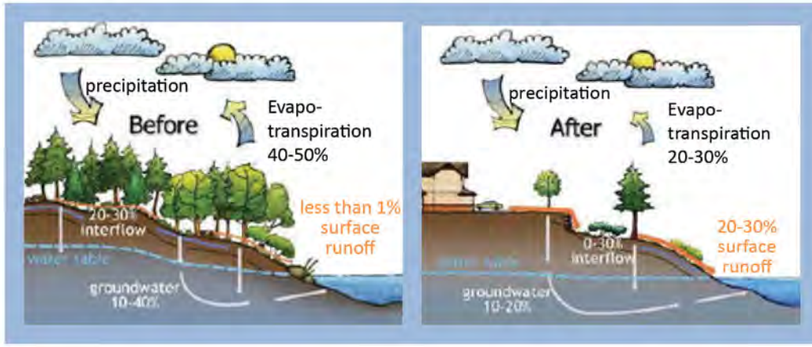
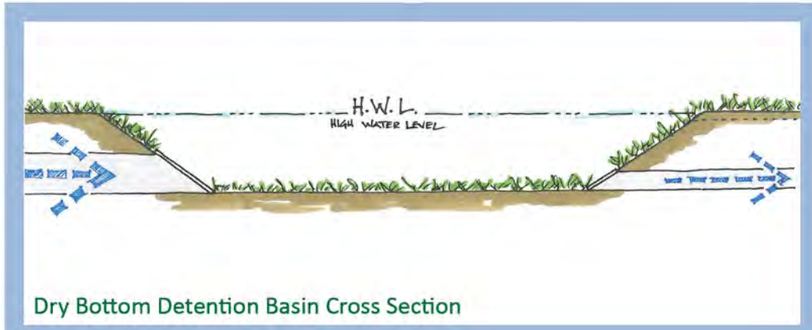
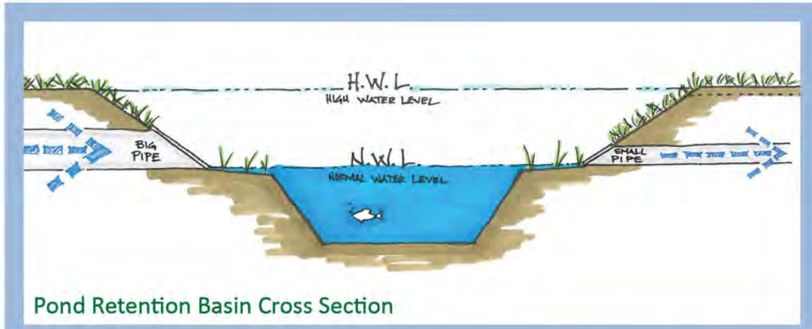


Figure 1-2: Before development almost all rainfall is taken up by plants, evaporates or infiltrates through the ground. After conventional development, surface runoff increases significantly while evaporation and infiltration into the ground decrease.
Images courtesy of Puget Sound Partnership.



Dry Bottom Detention Basin Cross Section

Figure 1-3: Dry bottom detention basins only occasionally hold water for a set period of time. Understanding the frequency and duration of water present will help develop your plant pallet.



Pond Retention Basin Cross Section

Figure 1-4: A pond retention basin always has water present but is designed to hold more water during a storm event. Native plants aid in bank stabilization and keeping the water clear.

Figure 1-5: Erosion along basin edge

Figure 1-6: Costly and unsightly rip rap stone along basin edge

They also provide high quality habitat that will support healthy populations of dragonflies, frogs, and fish, which in turn attract Blue Herons, Great Egrets, and other beautiful birds.

1. In some cases stone may be required to prevent erosion and can be combined with native plants in an aesthetic manner. Examples of situations that may require the use of stone include where overland flows are highly concentrated or on north/northeast shorelines of very large ponds where significant wave action is generated by prevailing winds

B. **Goose Control -** Ponds with mown lawn also invite large populations of Canada Geese who love easy access to water and feel secure being able to see potential predators for long distances. Geese can be aggressive toward humans, increase erosion by eating turf grass down to the roots, and leave large amounts of fecal matter all over walkways and in the pond. High levels of fecal matter in the water can also cause significant human health concerns. By incorporating native plantings that are three or four feet in height around their ponds, property owners can deter large populations of geese from their property (Figure 1-7).

C. **Algae Control -** Lawn and rock-lined ponds often display unsightly algae blooms during the summer months. Algae growth is regulated by nutrient availability in the water (especially phosphorus) and water temperature. Fertilizers used on the lawn surrounding a stormwater basin ultimately end up in the pond. Even fertilizers applied to a resident's lawn wash into the street, then into the storm sewer, and ultimately end up in the pond. Warm water washing from hot roads and rooftops enter the pond during rain events. Shallow water areas of a pond, such as the "safety shelf" (Figure 2-3) warm quickly in the summer sun. Algae uses nutrients from the fertilizer and the warmed water to reproduce at aggressive rates. By utilizing native plants around a pond many of the nutrients from fertilizers get used up by the plantings and as they grow in the shallow water areas they shade the water and reduce temperatures, reducing or eliminating algae growth. Algae growth can be reduced further if stormwater, specifically that water coming from highly fertilized residential lawns, is filtered through an additional BMP prior to entering the main pond. The use of several BMPs together to maximize filtration, infiltration, and overall water quality is typically referred to as a "Treatment Train."

1. The installation of fountains in a pond is sometimes suggested as a solution for algae growth. While fountains can help improve the overall health of the pond and aid in the decomposition of dead plant material in the pond (dead algae, dead plants, leaves, etc.), they often do little to prevent algae blooms from forming (Figure 1-8) because algae growth is tied to nutrient loads and water temperature. Fountains typically require a significant monetary investment upfront and will incur ongoing maintenance and operational costs. If you have an algae problem in your pond, make sure to understand the root cause and formulate an effective solution before investing limited resources.

1.01.02 Bioswales

Bioswales are a type of BMP characterized by a depressed area located along side or within an area of pavement (such as a parking lot) that are designed to collect and convey over-land stormwater from one point to another while filtering and increasing percolation of water into the ground. They may use existing or engineered soils and native plants. Depending upon the design requirements of the engineer, they may also include an underdrain installed below the soil complex to ensure that the system does not retain water for long periods of time (Figure 1-17)

1.01.03 Rain Gardens and Bioinfiltration Basins

BMPs characterized by shallow to deep depressed areas and are designed solely to infiltrate and percolate water into the ground (no over-land conveyance) are typically referred to as rain gardens (typically small) or bioinfiltration basins (typically large). These systems use either existing or engineered soils and native plants to treat and infiltrate the low intensity, high frequency rain events. Again, the design engineer may include an underdrain below the main soil complex to ensure that the system does not retain water for long periods of time.

1.01.04 Other

There are many other BMPs that can be implemented that may or may not incorporate native plantings but are focused on capturing and treating small, frequent rain events to encourage infiltration. For example, rock check dams can be installed within swales or the bottom of dry-bottom detention basins designed to temporarily hold back or slow down small amounts of water so that sediments and nutrients can settle out of the water prior to being released downstream (Figure 1-9). The Village encourages all residents and developers to implement

Figure 1-7: Native plantings hinder geese

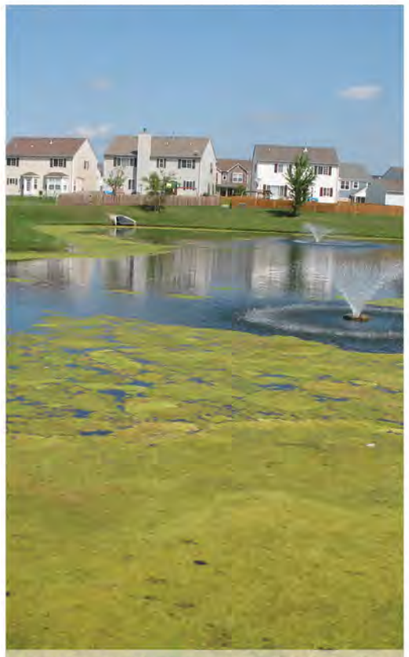


Figure 1-8: Algae persists with fountains


Figure 1-9: Rock check damn

stormwater Best Management Practices wherever practical at their property.

1.02 Open Space

When most people hear the words "open space," they may first think of national or state parks, forest preserves, or public parks. But consider that we each have a little bit of open space in our yards and most subdivisions have commonly controlled open space that is collectively "owned" and managed by the residents of that development, including stormwater facilities. These are all areas in which the Village encourages the incorporation of native plantings or the restoration of degraded natural areas that may already exist. Naturalizing our open spaces provides needed habitat for birds and butterflies, rebuilds soil, and encourages water percolation that can help relieve flooding, reduces the need for costly and dangerous fertilizers, eliminates the use of precious clean water for irrigation, reduces maintenance costs, and preserves our connection with the natural world. Following is a description of the main types of natural areas found in the Lemont area, these systems can be modeled when establishing native plants in an open space.

1.02.01 Woodlands

Populated with trees, woodlands can be sparse or they can be very dense. Historically, most of the land that comprises the Village of Lemont would have been woodland dominated by moderately spaced oak species with little brush understory (Figure 1-10 – Plat Map). In addition to trees overhead, the ground would have been lush with sedges, grasses, and wildflowers. Unfortunately many of our remaining woodlands have become crowded with lower quality secondary growth species and invasive species, such as honeysuckle and buckthorn. The amount of shade produced by the additional trees and non-native brush prevents healthy oak regeneration and suppresses, or even eliminates, the once lush woodland floor. By removing invasive brush, thinning low-quality trees, installing native species, and beginning an ongoing management strategy the community can once again breathe life back into our wooded open spaces.

High quality woodlands not only harbor rare native flora and fauna, they also provide unique recreational opportunities for people. With the help of signage and trails, a woodland that may be underused by the community can become an educational and relaxing attraction for residents and visitors, contributing to overall quality of life (Figure 1-11).

1.02.02 Prairies

French for "meadow," a prairie is a relatively flat, highly diverse, open grassland devoid of trees (Figure 1-12). Mostly comprised of grasses, sedges, and wildflowers, prairies were common throughout the Midwest but were not historically a dominant land cover throughout the Village of Lemont (Figure 1-10 – Plat Map). Prairies are a unique ecosystem where they do occur, with plants that have evolved over time to become resilient to a wide range of temperature fluctuations and rainfall variations. Their deep roots allow the plants to endure fires that would regularly sweep the plains, drought conditions that periodically occur in the Midwest, and harsh winters. These deep root systems are directly responsible for the development of the rich, highly organic soils that are so productive in Illinois. Because of their soil productivity, less than one-half of one percent of the original prairies in Illinois escaped conversion to crop land. By converting underused lawn to prairie and using prairie plants in our stormwater facilities, the community can replicate the highly productive systems of the past within our open spaces.

It takes three to five years of growth for a newly planted prairie landscape to become established. Prairie landscapes create beautiful vistas, attract butterflies and birds, don't require irrigation, and are typically much less costly to maintain than traditional turf grass. Ongoing management of prairies are required in perpetuity in order to keep the system healthy with a pleasant aesthetic.

1.02.03 Wetlands

Wetlands are some of the most beneficial ecosystems in the world and have been proven to increase water quality, provide habitat for a large number of plant and animal species, and reduce flooding or the damage caused by flooding. They are areas where water covers the soil or is present just beneath the soil and can occur in both wooded and open areas (Figure 1-13). Long periods of inundation create specialized habitats, which certain plants and animals evolved in, adapting to wet soil and standing water conditions. Historically, within the Village of Lemont wetlands would have been common along the Des Plaines River and occasionally found elsewhere (Figure 1-10 – Plat Map).

Many of our wetland areas today have been overrun with invasive species that originated in Asia or Europe, such as Reed Canary Grass or Common Reed (Figure 1-14). By restoring or creating natural wetlands using native plants we can create much needed specialized habitat, decrease flood damage and improve water quality before it enters our rivers and streams.

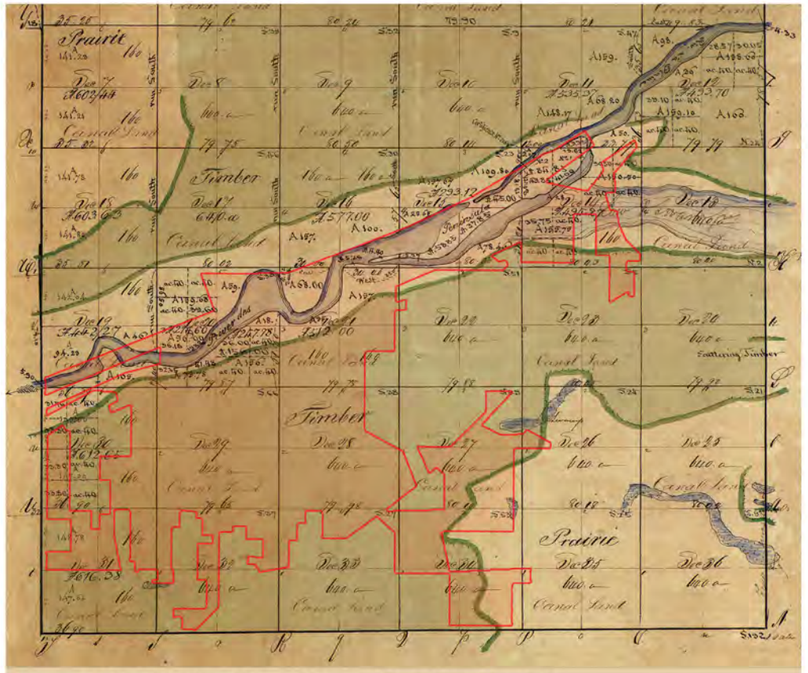


Figure 1-10: Historic plat map (Lemont is outlined in red)

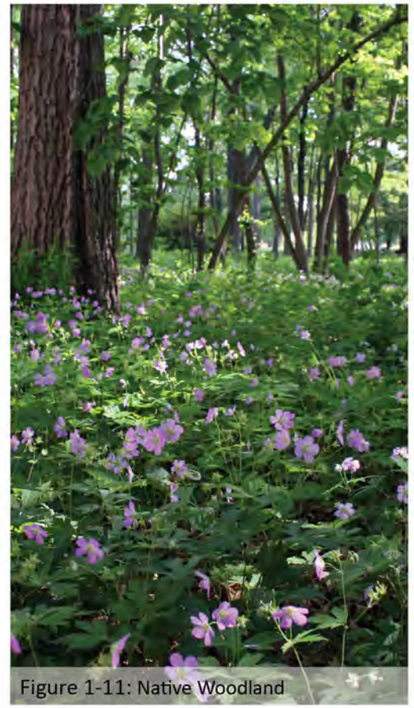


Figure 1-11: Native Woodland

Figure 1-12: Restored Native Prairie

Figure 1-13: Restored Native Wetland

Figure 1-14: Invasive Reed Canary Grass

1.03 Native Landscapes

Native plants are not only found in natural areas; they are commonly used within designed landscapes around corporate buildings, in a public parks, and in residential landscapes. Through their evolution in the Midwest, they have the genetic makeup to withstand our climate, without the use of pesticides and fertilizers and with little to no irrigation. If low maintenance is what you desire, native plants are the way to go.

Whether you have several acres of open space or a smaller residential lot within the Village, incorporating native plants is not a difficult task. You may be surprised to learn that many native species are available at your local garden center (Figure 1-15). If you're a hobby gardener it's likely that you have at least one species of native plant in your garden already! If you are looking to add native plants to your garden, it may be as simple as choosing a black-eyed Susan at the garden center instead of a daylily to spruce up an existing flower bed. Native plants can either be incorporated into a bed of existing flowers or can stand alone as a native garden. They create seasonal interest including flowers, fruits, fall color, and winter structure, while providing habitat and food for butterflies, bees, birds, and more.

If your project has a problematic wet spot, add native plants such as swamp milkweed or southern blue flag iris to create a rain garden that will look great and thrive in the soggy conditions. If deer have developed a liking for nibbling on your landscape plants, consider using native species such as purple coneflower and side oats grama — both resist deer browsing.

Many common challenges or constraints that sites face can be resolved through the use of native plants.

1.03.01 Buffalo Grass

Native plants can even be used to replace turf. Buffalo grass (Figure 1-16), a low-growing plant native to the Midwest, requires much less water than traditional Kentucky blue grass. Buffalo grass will stay six to eight inches at its mature height and can be mown once a month if a more manicured look is desired. It is a warm season grass that will require no irrigation, reduced amounts of fertilizer, and less mowing. Buffalo grass also has roots that reach up to 15 feet deep and will help with erosion and water percolation. Following are a few tips to ensure your Buffalo Grass lawn establishes and flourishes:

A. Use a cold-hardy cultivar of buffalo grass, such as 'Bowie'

B. Buffalo grass will perform best in a location that receives at least 6 hours of sunlight throughout the day and has moderately dry to very dry soil conditions.

C. Many suppliers of buffalo grass sell it for pasture planting and recommend a very low seeding rate. If establishing a lawn, use 100-150 lbs of seed per acre being seeded.

D. Buffalo grass is a warm season grass, which means it likes soil temperatures of at least 60-70 degrees and should be planted between June – August. In Lemont, it is not recommended to seed Buffalo Grass later than August. This is completely opposite of traditional Bluegrass or Fescue, both of which are cool season grasses typically planted in early spring or late fall.

E. Prepare the soil just as you would for a traditional lawn seeding, including a light application of gypsum and starter fertilizer.

F. For best results, cover the seeded area with a single-net straw erosion control blanket.

G. Apply water to the seeded area once in the morning and once in the evening for a 3-4 week period.

Figure 1-15: Common Native Plants for Landscape Applications

Figure 1-16: Native Buffalo Grass Lawn

SECTION 2

DESIGN CRITERIA

Successful establishment of native plantings requires regulatory compliance, ensuring that the right species are specified for the right location, utilization of quality products, and hiring experienced contractors. In effort to establish conforming and successful native planting areas that are attractive to the community and beneficial to the environment, the following section outlines the baseline design criteria that should be followed when planning a native planting project.

VILLAGE OF LEMONT

2.01 General Requirements

The **Director** must review and approve all proposed native planting plans for new development within the Village. For plan review purposes, a submittal checklist has been developed to summarize plan requirements for native planting plans, refer to Appendix E.

2.01.01 Requirements by the Ordinance

Required design criteria are described in the Village of Lemont Unified Development Ordinance. This document outlines the strategies in which to conform to those requirements using native plant species.

Refer to the following documents for specific requirements:

Lemont Unified Development Ordinance (UDO)

A. Chapter 17.20 Landscaping and Tree Preservation, Section 17.20.080 Landscape Standards for Detention Ponds

B. Chapter 17.24 Soil Erosion and Sedimentation Control

C. Chapter 17.29 Storm Water Management, Section 17.29.020 Design Standards

In addition to the Lemont Unified Development Ordinance, developments must also conform to all Federal, State, and County requirements. County stormwater regulations must be followed for all new development:

D. Developments within Cook County: The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC)

E. Developments within DuPage County: DuPage County Department of Environmental Concerns (DEC)

F. Developments within Will County: Will County Land Use Department (LUD)

2.01.02 Sources of Supply – Native Seed & Plants

A. Seed shall be purchased from sources specializing in native species. When available and economical, native seed and plant stock shall originate from sources within the same EPA Level III Ecoregion as the project site (Figure 2-1). If the specified species are not available from the same Ecoregion or are not economical to obtain, seed shall be obtained from an adjacent Ecoregion, preferably to the west or east, but no further than 350 miles from the project site unless otherwise approved by the Village Ecologist.

B. Seed supplier's facility shall have the capacity to maintain optimal conditions for seed viability and freshness, including but not limited to the ability to control temperature and humidity in each work area, from receiving through seed cleaning, processing, stock shelves and long-term storage.

C. Seed not grown by the vendor must be clearly indicated and accompanied by the name and address of the company which grew the seed.

D. Proposed nursery(s) shall be approved by the Village Ecologist prior to commencing work.

2.01.03 Native Seed Quality

It is of critical importance to procure high-quality native seed for your project. Native seed is not the same as turf grass seed, which has been genetically modified and perfected for enhanced germination. Native seed is grown naturally, collected in many cases by hand, and processed according to species. If this process is done incorrectly or if the seed is not stored appropriately, it can quickly go from good viable seed to dead seed that may never germinate. Using the following minimum standards for seed quality will eliminate one of the many pitfalls to successful establishment of native plantings. Keep in mind that there is typically a difference in price between good viable native seed and bad native seed. However, even though quality seed may cost a bit more in the beginning, the investment typically saves money over the life of the project by reducing or eliminating the need to re-seed and by establishing more quickly providing competition for weeds (Figures 2-2 and 2-3).

A. Standards:

1. All seeds shall comply with the Federal Seed Act.
2. All seeds shall be of straight species. No horticultural varieties shall be acceptable unless otherwise approved in writing by the Village Ecologist.

B. Applicant shall provide a fresh clean crop of the specified seed species. All native seed supplied shall be from seed lots tested by a qualified seed testing laboratory. Certificates for each lot of each species tested must be supplied to the Village Ecologist on letterhead from the testing laboratory. Seed test results shall be dated no more than 12 months prior to the anticipated seed installation date.

C. "Bearded" forb species seed (*Symphyotrichum*, *Solidago*, *Liatris*, etc.) shall be provided as defluffed/ debearded seed. Legumes (*Dalea, Lespedeza*, *Desmodium*, etc.) shall be provided as de-hulled seed.

D. All native seed shall be provided on a pure live seed (PLS) basis. Actual seed amounts used on the project will vary with the actual percent of PLS in the seed lot. Seed supplied to the site shall contain documentation of PLS testing and, if required, adjustment of the seed weights to provide 100% PLS standards. If rounding is required during PLS adjustment calculations, the adjustment shall always be rounded up. Minimum PLS percentage for any species shall be 70% unless

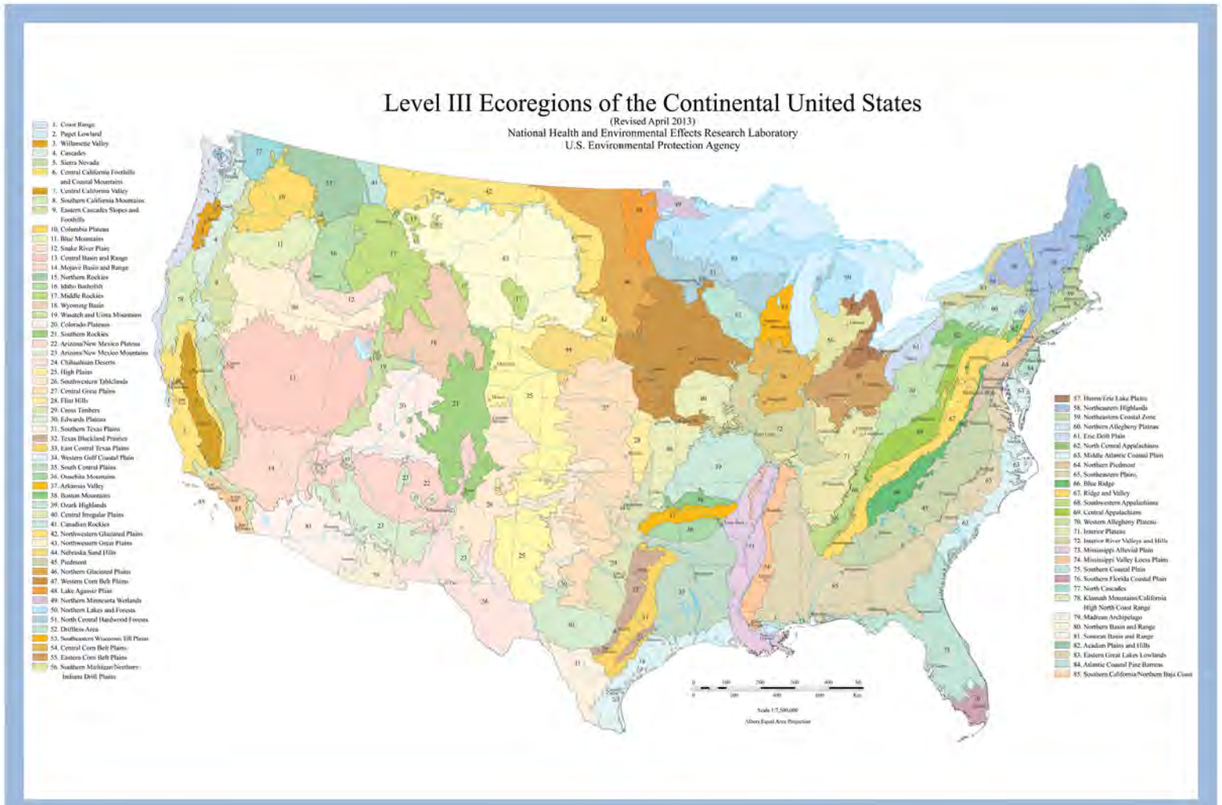


Figure 2-1: Map of the Ecoregions of the United States - This map illustrates the division of ecosystems that contain specific species, natural communities, and climate. Part of Illinois is in region 251, while the Cook, DuPage, and Will counties are within the 222 region.

Figure 2-2: Low Quality Native Seeding

Figure 2-3: High Quality Native Seeding

Figures 2-2 & 2-3: There is a vast difference in seed quality and rates between installation companies. It is recommended to specify the minimum standards in this section to ensure a successful installation with appropriate seeding rates and quality criteria.


Figure 2-4: Native Seed to be Mixed On Site


Figure 2-5: Sealed Native Seed Bags

Figure 2-6: Necessary Seed Label Information

otherwise approved in writing by the Village Ecologist.

E. Seed containing noxious weeds will not be accepted. Seed containing weed seed in excess of 0.5% will not be accepted. Seed collected from the wild will not be accepted unless approved in writing by the Village Ecologist. It is a violation of the law to disturb, injure, or collect any plant on a national wildlife refuge or state nature preserve without a permit.

F. When required, seed shall be appropriately stratified prior to installation, specifically species requiring scarification. If the project has been designed for a dormant seed installation using a "stratification seed mix" and the Applicant misses the optimal installation timeframe, they shall artificially stratify any seed species identified as requiring stratification prior to installation. The installation of artificially stratified seed may also require temporary irrigation.

G. All seed shall be shipped in single species containers directly from the supplier and shall be mixed at the time of planting by the Applicant (Figure 2-4). At no time shall seed species be mixed by the supplier unless approved in writing by the Village Ecologist.

H. All seed shall be furnished in sealed containers (Figure 2-5). Seed that has become wet (unless as properly intended as a result of stratification), moldy, or otherwise damaged in transit or storage will not be acceptable.

I. Seed packaging shall be legibly tagged as to supplier name and address, project name, seed mix name, species scientific name, species common name, lot number, specified quantity (adjusted for acreage), and PLS adjusted quantity (adjusted for acreage), refer to Figure 2-6. Seed stock shall be true to species as specified in this document or as approved in writing by the Village Ecologist.

J. All native seed mixes will be accompanied by a cover crop consisting of *Avena sativa* (seed oats) at a rate of forty (40) pounds per acre with spring planting or ReGreen™ (or approved equal) at a rate of fifty (50) pounds per acre for fall plantings. The cover crop shall be the only non-native species planted. The Village Ecologist may approve the deletion of the cover crop as a result of site conditions.

K. All native seed mixes will be accompanied by a granular form of endomycorrhizal inoculum at a minimum rate of forty (40) pounds per acre and rhizobia inoculum for the appropriate plant species at rates recommended by the native seed supplier. Applicant shall provide proof that the mycorrhizal inoculum utilized contains a majority of live spores.

2.01.04 Native Plant Quality

A. Standards:

1. All plant materials, methods, etc. are to conform to the Standards of the American Association for Nursery Stock (ANSI Z60.1-2004). In the event there is a discrepancy between ANSI standards and this document, the most restrictive requirement shall govern. Following are acceptable standards for native herbaceous perennials in the sizes as specified:

   a. **2" Potted Material** – provided in single-form factor plug trays that are configured to grow plugs at least 2" in diameter/square by 4-1/2" deep (minimum 11.3 in³ dry soil volume), unless otherwise noted in this document or as approved in writing by the Village Ecologist (Figure 2-7).

   b. **1 Quart Material** – provided in thermo- or vacuum-formed pots that are at least 4" diameter/square by 4-3/4" deep (minimum 57.8 in³ dry soil volume), unless otherwise note in this document or as approved in writing by the Village Ecologist.

   c. **#1 Container Material** – provided in thermo- or vacuum-formed pots that are at least 5-1/2" in diameter/square by 5-1/2" deep (minimum 115.5 in³ dry soil volume), unless otherwise noted in this document or as approved in writing by the Village Ecologist.

2. All plants shall be of straight species. No horticultural varieties shall be acceptable unless otherwise approved in writing by the Village Ecologist.

B. Live plant containers shall be legibly tagged as to name and size of container and shall be true to species as specified in this document.

C. All live plants shall be alive, healthy, hydrated, and in a vigorous growing condition at the time of delivery.

D. All live plants will be inoculated with a broad-spectrum mycorrhizal fungi mix. All leguminous species must be inoculated with the proper strain of rhizobia inoculum.

E. For ephemeral, emergent, floating aquatic other specific types of native species, bare root stock may be utilized upon written approval by the Village Ecologist.

F. Applicant shall provide written documentation to the Village Ecologist as to the source of supply, quantities, and species by scientific and common name of the live plants ordered prior to installation (e.g. supplier's invoice).

Figure 2-7: 2" Native Potted Plug with Label

2.01.05 Contractor Qualifications

The right Natural Areas Contractor is another critical step in ensuring successful establishment of a native planting project. There is an entire industry focused on installing and maintaining native plantings, it is significantly different than traditional landscaping. The Village encourages developers to talk with several different contractors who specialize in natural areas work, check references, and take the time to visit their projects. Quality contractors may cost a bit more but will typically stand behind their work and won't charge for continued failures. They also tend to achieve final acceptance much more quickly than an inexperienced contractor, which should save money over the life of a project. Refer to Appendix B for a list of regional professional Natural Area Contractors (provided for reference only), the Village has provided some minimum qualification criteria below.

A. All work within native planting areas shall be performed by a Natural Areas Contractor with extensive documented experience in selective brush and tree clearing for the purposes of ecological restoration, native seeding, planting, and natural areas management, and shall be able to demonstrate their knowledge in the field.

   1. Because it can take 3-5 years before a natural area matures and can be determined a success or a failure, the Village recommends the use of Natural Areas Contractors having a minimum 5 years of experience and prefers at least 7 years of experience.

B. Foreman, laborers, and other field staff shall be thoroughly familiar with natural areas restoration and shall have a working knowledge of the type and operation of equipment being used. All Natural Areas Contractor crewmembers shall be well versed in the identification of native and non-native woody and herbaceous species during both the dormant and growing seasons. Any personnel applying herbicide shall be currently licensed by the State of Illinois as a Pesticide Operator and shall be directly supervised by at least one (1) Certified Pesticide Applicator.


Figure 2-8: Native Planting Contractor

C. If conducting prescribed fire, the Burn Boss shall have met the requirements of Illinois Law and Regulations (17 Illinois Admin. Code 1565.70) and shall be recognized as a Certified Prescribed Burn Manager in compliance with the Illinois Prescribed Burning Act (525 ILCS 37). All prescribed fire crewmembers shall have a minimum of one year documented experience conducting prescribed fire and successful completion of NWCG S130/S190 or equivalent.

2.01.06 Design Requirements for Trees and Shrubs within Native Planting Areas Maintained with Fire

Trees and shrubs can easily be damaged by prescribed fire used for native planting management, fire exclusion zones aid in tree and shrub protection during management operations. The Village has established the following minimum design requirements for trees and shrubs placed within native planting areas:

A. Trees and shrubs planted within native planting zones shall be native to the Lemont area and shall be species known to be fire tolerant unless otherwise approved by the Village Ecologist.
B. Around proposed deciduous trees, provide a minimum five foot (5') diameter mulch ring. The minimum mulch buffer (area between tree and native planting) shall be two feet (2').
C. Around proposed evergreen trees, provide a mulch ring equal to two times (2x) the canopy diameter at the time of planting. The minimum mulch buffer (area between tree and native planting) shall be three feet (3').
D. Shrubs shall be planted in groupings, provide a mulch bed one and one-half times (1.5x) the width of shrub at maturity. The minimum mulch buffer (area between shrub and native planting) shall be two feet (2').

2.02 Stormwater Management Design

In order to establish native species within stormwater management facilities and streambanks, they must be designed to accommodate seed germination and plant development throughout the establishment period. Native planting design for detention facilities shall be based upon hydrograph data provided by the project engineer. See Appendix G for more information on hydrographs.

2.02.01 Stormwater Basins

There are three major types of stormwater basins (See Section 1, Figures 1-3 and 1-4 for Cross Sections):

A. Dry-Bottom Detention Basin (Figure 2-9) – Just as the name implies, these basins have a bottom that is dry except during rain events. They are designed to detain stormwater temporarily after a rain event, releasing it slowly downstream over an extended period, sometimes referred to as "draw down time." Implementing native plantings within these basins decreases soil erosion, promotes water infiltration, and helps to filter pollutants out of the smaller, more frequent rain events.
    1. Basin Design Criteria –
        a. Dry-bottom basins should be designed to have positive drainage to ensure that all the water drains from them following a rain event. It is impossible to perfectly grade a completely flat bottom basin and it will always end up with un-planned low spots that stay wet and may not support the species specified for a dry-bottom condition. If a flat bottom is desired, plunge pools shall be incorporated throughout the basin in order to ensure designed low areas for water to settle. These areas can then be planted with a different set of species suited for wetter environments.
B. Wet-Bottom Detention Basin (Figure 2-10) – Wet-bottom basins are designed similarly to dry-bottom basins but retain small amounts of water after a rain event and incorporate wetland plantings within the bottom of the basin.
    1. Basin Design Criteria –
        a. Water depths shall be less than twenty four inches (24"), with preferred depths between six to twelve inches (6-12"). Vegetation will be sparse in 18-24" water depths. Water depths of 24-48" will typically not support quality vegetation and will be subject to algae blooms.
        b. Water depths shall be varied throughout the basin bottom, creating some areas that become exposed during drier time of the year. This creates better habitat and encourages populations of insects and other animals that feed on mosquitos.
        c. Water depths greater than eighteen inches (18"), shall include the installation a water control structure,

Figure 2-9: Successful Naturalized Dry Bottom Detention Basin

Figure 2-10: Successful Naturalized Wet Bottom Detention Basin

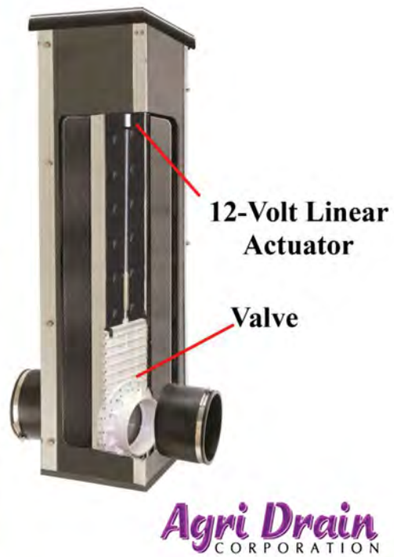


Figure 2-11: Water Control Structure

Figure 2-12: Successful Naturalized Pond Retention Basin

such as those manufactured by Agri-Drain (or approved equal), so that water levels can be lowered for planting and maintenance purposes (Figure 2-11). Water lowering capacity shall be a minimum of eighteen inches (18") below proposed normal water level.

d. Sedimentation forebays shall be included below the invert elevation of each stormwater pipe that flows into the basin.

C. Retention Basin – As the name implies, retention basins are designed to retain water permanently and are often referred to as a "pond" (Figure 2-12). These basins still provide a detention function, capturing and detaining stormwater during rainfall events above the normal water level. Because these basins hold water all year and are subject to ice sheer during the winter, shoreline erosion is a major concern with this type of basin. Implementing native plantings along the shoreline and up the slope decreases soil erosion, deters geese, filters pollutants, and helps reduce algae blooms.

1. Basin Design Criteria –

a. The safety shelf shall be designed to have a water depth below twelve inches (12") in order to support the maximum amount of plant material, preferably no more than six inch (6") depth over the first five feet from shore.

b. Beyond the safety shelf, basin grades shall drop to a final minimum depth of ten feet (10'), which is the depth required for overwintering of most fish species. Plant material will struggle to establish in water levels deeper than eighteen inches (18"). As the water level deepens, the water temperatures cool making it more difficult for algae to grow.

c. Retention basins will receive some eroded soil that will settle in the bottom (referred to as "sediment") during construction, it will also collect various organic materials (leaves, dead algae, etc.). Sediment and muck development will reduce the overall depth of a pond over time, therefore basin bottom depths shall be designed a minimum of two feet (2') below the desired final basin depth.

d. Water depths greater than eighteen inches (18"), shall include the installation a water control structure, such as those manufactured by Agri-Drain (or approved equal), so that water levels can be lowered for planting and maintenance purposes (Figure 2-11). Water lowering capacity shall be a minimum of eighteen inches (18") below proposed normal water level.

e. Sedimentation forebays shall be included below the invert elevation of each stormwater pipe that flows into the basin.

2.02.02 Stormwater Basin Species Selection

A. On the bottom of a dry-bottom basin, specify plants that can withstand long periods of drought and shorter periods of inundation. Redundancy is important in these mixes: incorporate a combination of dry, mesic, and wet adapted native species.

B. On the bottom of a wet-bottom basin and within the safety shelf of retention basins, specify plants that can withstand continually wet soils and/or standing water conditions. In basins that produce hydrographs showing frequent, long periods of high inundations (one foot or more over a 72 hour period) it may be necessary to specify a portion of the plantings as lower quality floodplain species adapted to frequent long-periods of inundation.

C. The area of slope between Normal Water Level (NWL) and High Water Level (HWL) is referred to as the "bounce zone." During rain events water level fluctuates in this area, specify plants that can withstand long periods of drought and shorter periods of inundation. It is advisable to design species lists for between NWL and the 2-year storm, between the 2-year storm and the 10 or 25-year storm, and between the 10 or 25-year storm and the 100-year storm.

D. See Figure 2-13 for planting zone cross sections and Appendix A for the Village approved native seed and plant mixes.

2.02.03 Water Quality BMPs

The Village encourages residents and developers to incorporate BMPs on their properties, minimum design criteria for the most common water quality BMPs are provided below.

A. Bioswales – There is no single, perfect design for bioswales. They can take many shapes and forms (See Figure 2-14).

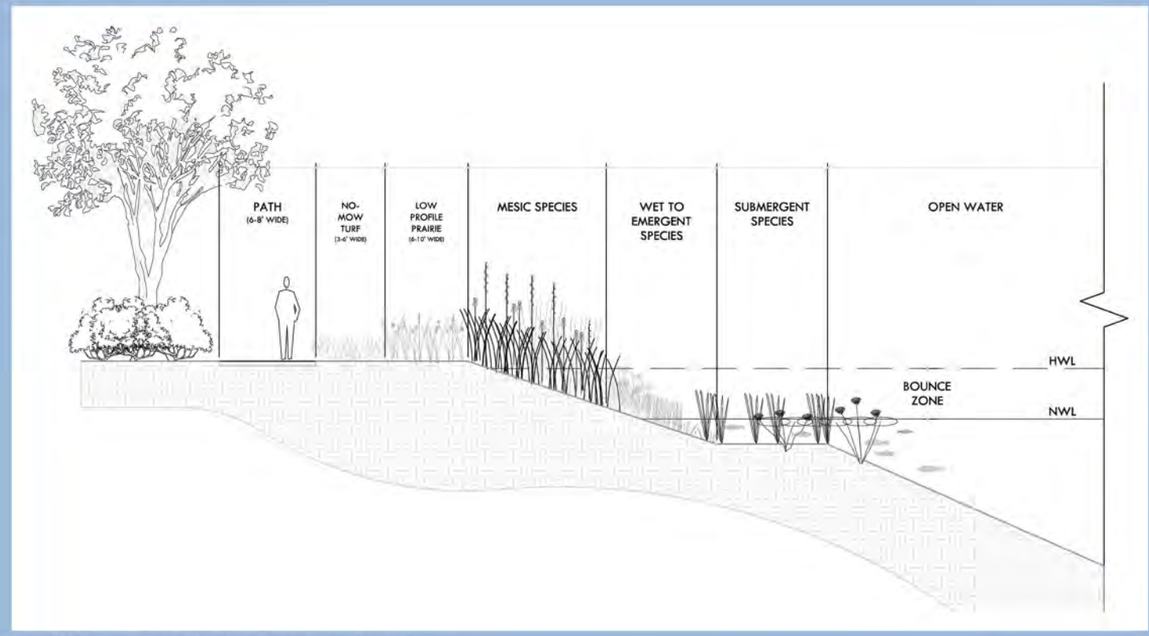


Figure 2-13: Example Planting Zone Cross Section

Figure 2-14: Bioswale in a Parking Lot using Native Plants

Bioswales can be designed to percolate and filter water through an engineered soil matrix or can be designed simply as over-land stormwater conveyance systems that rely on native plantings to filter the water as it passes through the system. They can be designed to remain wet or to dry out after each rain event.

1. General Design Criteria –
    a. Bioswales should be designed to hold a minimum of a 10-year storm, have minimum 3:1 side slopes, must have positive drainage of no less than 0.5%, and must have a designated emergency overflow pathway.
    b. To achieve proper infiltration the swale shall have a percolation rate into existing soils of greater than one-half inch per hour.
        i. If the existing soil has adequate percolation take great care not to compact the soils during construction.
        ii. If the existing soils do not have adequate percolation rates or become compacted, water infiltration will not be possible without modification. A sand-based engineered soil (70% sand) in the swale bottom and non-socked perforated drain tile surrounded by six inches (6") of clean washed gravel at a minimum of forty eight inches (48") below the surface are required.
    c. A water bypass valve is required so that water levels can be controlled during plant establishment. For example, if the bioswale is designed to hold 24" of water during a rain event, significant inundation during plant establishment may kill the newly installed plants. The valve can remain open during plant establishment to ensure significant standing water does not occur. Once the plants mature, the valve can be closed and the bioswale can function as designed.
    d. A water source for irrigation during plant establishment is required, especially when using a sand-based engineered soil matrix. Plants shall be watered consistently for 6-8 weeks following installation and long-term may need supplemental water in times of extreme drought.
2. Bioswale Plant Selection Criteria –
    a. Because the soils in the Village of Lemont do not typically percolate well, especially after construction, most bioswales tend to be designed with an engineered soil and underdrain system. This means that the soils will be wet during rain events, but will be dry a majority of the time. Wetland plants will not survive or may perform poorly during long dry periods, though many upland species can easily withstand short periods of inundation.
    b. At a minimum, live native plants must be specified for the bottom of all bioswales. Native seed can be used along with the plugs and on the side slopes, but plugs are required to be planted on the bottom unless otherwise approved by the **Director**. In a bioswale, seed can be easily washed away by water flow and germination can too often be impeded by salt deposits from roads and parking lots.
    c. Plant height must be considered when designing a bioswale species list. Many bioswales are located next to parking lots and sidewalks, in which case a shorter plant palette should be chosen to ensure that plants do not inhibit pedestrian and automobile sightlines (Figures 2-15 through 2-17).
    d. See Figure 2-13 for planting zone cross sections and Appendix A for the Village approved native seed and plant mixes.

B. Rain Gardens and Bioinfiltration Basins – Similar to bioswales, rain gardens and bioinfiltration basins are intended to catch runoff and improve water quality. The difference is that rain gardens are not designed to convey over-land stormwater.
1. General Design Criteria –
    a. The bioswale design criteria shall apply as well as Figure 2-18.
2. Rain Garden and Bioinfiltration Basin Plant Selection Criteria –
    a. Apply the bioswale plant selection criteria and see Appendix A for the Village approved native seed and plant mixes.
    b. Often implemented by homeowners, rain gardens can direct stormwater to a planting bed so that the rest of the yard stays dry, diverting it away from entering storm sewer systems. Rain gardens can be designed as a landscape feature by choosing showy plants and those that specifically attract beneficial wildlife.

Figure 2-15: Clean and simple bioswale planting design using natives

Figure 2-16: Poor Bioswale Planting Design

Figure 2-17: Poor Bioswale Planting Design

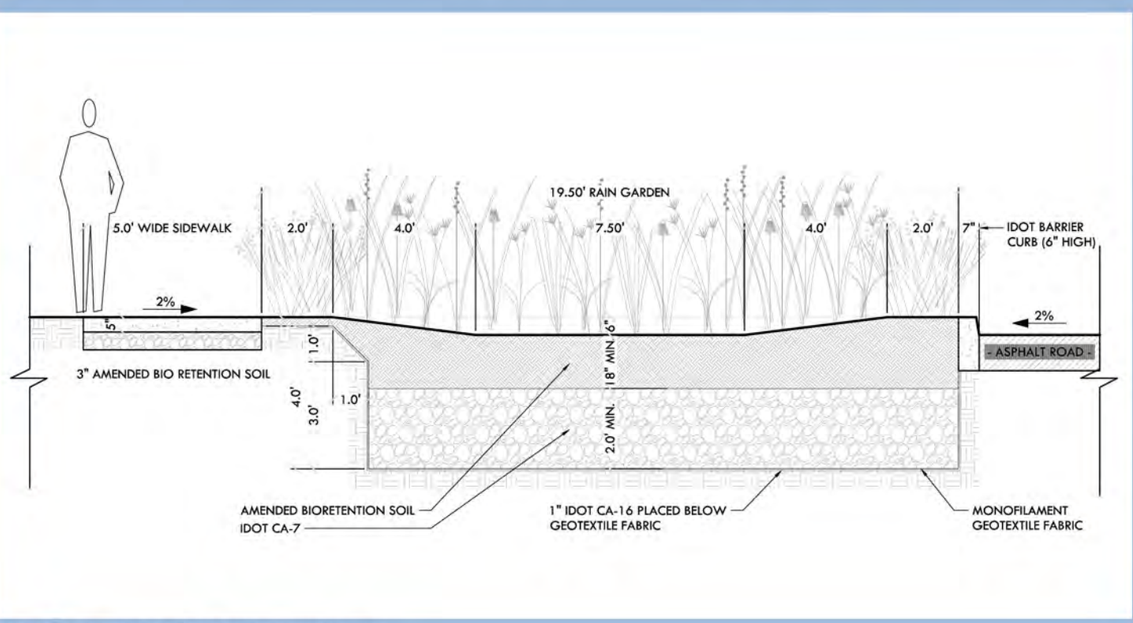


Figure 2-18: Example Rain Garden Cross Section

SECTION 3

CONSTRUCTION & PLANTING GUIDELINES

Proper site preparation and installation techniques are a key component to successful native planting establishment. A detailed, well thought out installation program should rule out many costly mistakes, reduce re-work, and lead to quicker plant establishment. In an effort to establish conforming and successful native planting areas that are attractive to the community and beneficial to the environment, the following section outlines the minimum baseline design criteria that should be followed when developing construction plans and specifications.

VILLAGE OF LEMONT

The **Director** must review and approve all proposed native planting plans for new development within the Village. For plan review purposes, a submittal checklist has been developed to summarize plan requirements for native planting plans, refer to Appendix E.

3.01 Site Preparation

3.01.01 Existing Vegetation Protection

Prior to beginning design, survey and create a general inventory of existing vegetation throughout the project site. The Unified Development Ordinance requires that existing trees, wetland, and riparian areas be identified on any proposed development plans. The Village also encourages applicants to assess the ecological quality of those areas and any other areas on the property that might be considered high quality (e.g. a remnant plant community). The applicant should make every effort to preserve identified areas of high quality existing vegetation and protect them appropriately during construction. Protection measures are to be detailed within the construction plans and specifications, but generally include:

A. Tree Protection – Mature trees slated to remain should be protected from direct damage to trunks and limbs, however equally important is to protect the root zone from filling and compaction. The majority of a tree's feeder roots are within the top two inches of soil. This is how a tree gets much of its water and oxygen. If the feeder roots are smothered by the placement of fill, compaction due to vehicles, tilling, or soil excavation, the tree may be severely damaged or die. Tree protection shall be as per the Unified Development Ordinance.
B. Wetland Protection – Wetlands that are not being impacted by the Applicant should be protected by placing silt fencing around the perimeter of the required wetland buffer. The Village encourages applicants to include restoration and management plans for existing wetlands as part of the land development process. Quality restored wetlands benefit the community and make the development more marketable. **Mitigation wetlands that have been approved by the appropriate regulatory agency shall be designed following these design standards.**
C. Other Natural Areas Protection – High quality remnant natural areas or reconstructions shall be protected by erecting temporary high visibility fencing to deter equipment from causing damage during construction.

3.01.02 Brush and Tree Clearing

Site preparation begins with the removal of undesirable woody and/or herbaceous plant materials (Figures 3-1 through 3-3). Brush and trees identified for removal on approved plans may be cut by hand or with mechanized equipment.

A. General vehicle traffic in natural areas should be restricted as much as possible. To minimize impact on soil structure, remnant integrity, and restoration potential, clearing and brush cutting shall be performed when soils are dry and/or froze. When possible, low ground pressure equipment should be used.
B. Hand removal is the Village's preferred method of brush or tree removal and typically involves the use of chainsaws, hand saws, and loppers.
C. Mechanized removal typically involves the use of large wheeled or tracked vehicles equipped with large mowing or grinding implements.
D. All cut stumps shall be treated with an appropriate herbicide by a State of Illinois Certified Pesticide Applicator/Operator immediately following cutting, ensuring that the herbicide is applied to the cambium layer of the woody plant.

3.01.03 Bare Soil Site Preparation

The following design criteria pertain to native planting areas proposed for sites with bare soil, such as recently farmed agricultural sites or sites that have been recently graded.

A. The Applicant shall ensure proper preparation within planting areas. A preconstruction meeting prior to issuance of a site development permit and at least one (1) meeting during construction shall be held in order to coordinate equipment movement within planting areas to avoid/reduce soil compaction and to review underground utility location maps and plans. These meetings shall be between the Applicant and the Village and shall be coordinated by the Applicant. It is the responsibility of the Applicant to ensure that the native planting areas are prepared according to this document.
B. After the completion of subgrade preparation the Applicant shall till soil to a depth of four (4) inches within areas designated for native seed mixes (Figure 3-4). When conditions are such that satisfactory results are not likely to be obtained, the work will be suspended and shall resume only when conditions are appropriate. Undulation or irregularities in the surface that would interfere with the Applicant's operations or maintenance shall be leveled before the next operation (Figure 3-5).
C. Following subgrade preparation, Applicant shall spread topsoil within proposed native planting areas in a manner that will meet the thickness, grades, and elevations shown on approved engineering plans after light rolling and natural settlement (Figure 3-6). When conditions are such that satisfactory results are not likely to be obtained, the work will be suspended and shall resume only when conditions are appropriate. Spread approximately ½ the thickness of required topsoil over loosened subgrade*. Work into top of loosened subgrade to create a transition layer, then spread remainder of topsoil. Minimum topsoil depths shall be as

Figure 3-1: Clearing of a project site infested with buckthorn and invasive species

Figure 3-2: Post clearing photo illustrating an open ground plane

Figure 3-3: The same site the summer after brush clearing and seeding

Clearing the invasive brush within wooded sites allows light to reach native plants that were stifled by their presence. Once the brush is removed these plants have the resources and space to grow. Unfortunately, so do weeds. If a rigorous maintenance routine and planting strategy isn't immediately implemented, the site will revert back to the unsightly and impenetrable brush.

follows:

1. Four inch (4") depth
   a. Uplands
2. Six inch (6") depth
   a. Basin slopes
3. Twelve inch (12") depth
   a. Dry-bottom detention basin bottom
   b. Wet-bottom detention basin bottom
      - *Subgrades on Wet-Bottom Basins shall not be loosened
   c. Retention basin "safety-shelf" planting zones

D. Once soil placement has occurred, Applicant shall spread any necessary amendments and mix thoroughly into the upper four (4) inches of topsoil. If planting will not proceed within 72 hours of incorporation the spreading of amendments shall be delayed. If required, mix lime with dry soil before mixing fertilizer.

E. Prior to beginning seeding/planting operations the Applicant shall:
   1. Confirm topsoil placement within all native planting zones.
   2. Review soil test results, including existing soils and any imported soils. If soils within native planting zones do not meet specification they shall be amended or replaced by the Applicant prior to beginning seeding/planting operations.
   3. Confirm that all foreign matter and/or soil clods larger than two inches (2") in any dimension have been removed within native planting zones. Applicant shall be responsible for removing all foreign matter prior to beginning seeding/planting operations.
   4. Soil shall be loose and friable without compaction of topsoil (4-12" depth) or prepared subsoil depth (8-16" depth). A two hundred (200) pound person should leave a one-quarter to one-half inch (¼" – ½") deep footprint. Applicant shall be responsible for remediating any compacted areas within native planting zones prior to beginning seeding/planting operations.
   5. Request a meeting with the Village Ecologist to review the above items and receive written approval to proceed with native planting operations.

F. Whenever possible, the Applicant shall utilize equipment having low unit pressure ground contact within planting areas. They shall take precautions to ensure that equipment and vehicles do not damage the grading, utilities, structures, or existing trees and shrubs during planting operations. Any damage shall be repaired by the Applicant.

G. Non-native perennial species may require control with a low toxicity (2% mixture), non-persistent glyphosate based herbicide. Under no circumstances are persistent herbicides to be used. Apply herbicides as needed after grading operations.

H. Following any herbicide applications, allow 10-14 days prior to cultivating for seed bed preparation. If weed growth persists after the initial application, reapply herbicide and delay cultivation for at least 10 days.

3.01.04 Vegetated Site Preparation

The following design criteria pertain to remnant sites undergoing restoration and areas with degraded existing vegetation that will be restored using native plantings.

A. Planting areas that contain solid stands of existing non-native/weedy herbaceous vegetation and are not to be disturbed by grading operations, or have been graded and now have established non-native/weedy herbaceous vegetation, shall be treated with applications of a glyphosate herbicide resulting in a complete kill of all existing vegetation. Broadcast or "boom" spraying of herbicide is acceptable under these conditions; precautions shall be taken to eliminate damage from overspray.

B. Planting areas that contain existing desirable native herbaceous vegetation and are not to be disturbed by grading operations shall be treated with applications of an appropriate selective herbicide, resulting in a 99% kill (brown-out) of non-native/weedy herbaceous vegetation and the survival of existing desirable native herbaceous vegetation. Limited spot applications of herbicide shall be utilized if conservative native plant species within the planting are to be preserved.

C. Planting areas that are heavily vegetated with persistent species such as fescues (*Festuca spp.*), reed canary grass (*Phalaris arundinacea*), or Canada thistle (*Cirsium arvense*) often require two or more herbicide applications at 2-3 week intervals to kill resprouts and seedlings from the existing seed bank. When these conditions exist the Village recommends that the Applicant budget for a minimum of three (3) herbicide applications.

D. Herbicide applications in or adjacent to shorelines or open water shall utilize an herbicide approved for aquatic use.

E. Mowing and/or prescribed fire may be utilized by the Applicant to eliminate standing biomass prior to seeding.

F. Seed-to-soil contact is critical for native seed germination and plant development. Wherever biomass, thatch, or any other debris remains on the soil surface that will inhibit good seed-to-soil contact, the Applicant shall "hard rake" the soils within vegetated planting areas prior to seed installation utilizing a gill rake, forestry mower, power dethatcher, or other method intended to expose the existing site soils for proper seeding (Figure 3-7). In areas with obstructions preventing the use of mechanized equipment, the Applicant shall scarify the existing soil with hand tools (Figure 3-8). Care shall be taken within the drip line of existing trees to ensure that no more than two inches (2") depth of soil is disturbed. Prior to conducting soil scarification operations, the Applicant shall submit their proposed plan to the Village Ecologist for approval.

G. Applicant shall not disc or roto-till the soils within vegetated

Figure 3-4: Tilling the soil

Figure 3-5: Ruts in the soil to be smoothed

Figure 3-6: Acceptable prepared site

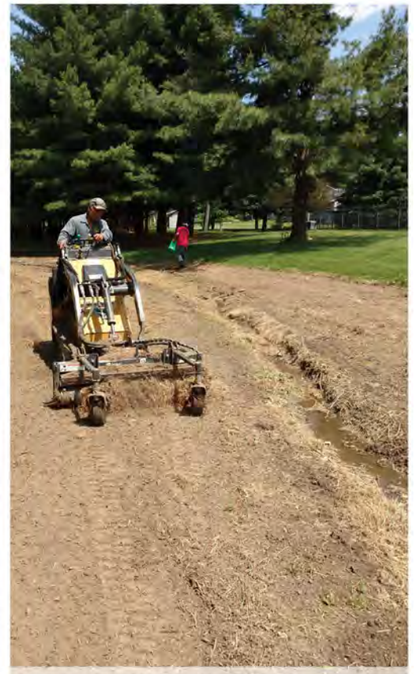


Figure 3-7: Removing debris & prepping site

Figure 3-8: Hand racking in seed

planting areas prior to planting, unless the area(s) have been heavily trafficked/compacted or as otherwise directed by the Village Ecologist. Whenever vegetated planting areas are disturbed, they shall be prepared for planting as per this document.

H. Whenever possible, Applicant shall utilize equipment having low unit pressure ground contact within planting areas. They shall take precautions to ensure that equipment and vehicles do not damage the grading, utilities, structures, or existing trees and shrubs during planting operations.

3.01.05 Soil Testing & Amendments

Soil analysis and testing can determine the ability of a site to support vegetation. If the history of the site or the soil brought to the site is unknown, this simple and inexpensive preventative step can save residents and developers money by reducing the likelihood of an unsuccessful installation. The Village has established the following minimum criteria to be applied within native planting areas:

A. The Village encourages the Applicant to test soils throughout all native planting areas, at a minimum the following situations require soils to be tested by an independent laboratory regarding its suitability for native seed germination:
   1. Soils within the bottom of stormwater facilities (detention basin bottoms, naturalized swales, etc.) that have had the potential to be exposed to over-winter road salt drainage prior to native seed installation.
   2. Soils within one-hundred feet (100') of existing roadways.
   3. Imported soils.

B. If it is discovered that a soil's condition will inhibit native seed germination, the Native Landscape Contractor shall submit a soils mitigation plan to the Village Ecologist for approval prior to installation of native seed. The soil mitigation plan may include soil amendments to correct soil structure, nutrification and/or chemistry, or it may include the importation of suitable topsoil.
   1. The testing laboratory and/or an Agronomist should determine whether a soil's condition will inhibit native seed germination based upon the full results of the soil test. However, in general a soil condition that inhibits native seed germination is one that typically* exhibits one of the following characteristics:
      a. pH outside of the range of 6.5 – 7.8
      b. Exchangeable Cations of Sodium (NaCl) above 100 lbs/acre
      c. Base Saturation (Percent) of Sodium (NaCl) above 1%
      d. Base Saturation (Percent) of Magnesium (Mg) above 12%
      e. Soluble Salts measuring above 2 mmhos/cm

      *the above characteristics/limitations are generalities, the soil test shall be evaluated in its entirety by the Applicant in order to determine the soil's suitability for native seed germination.

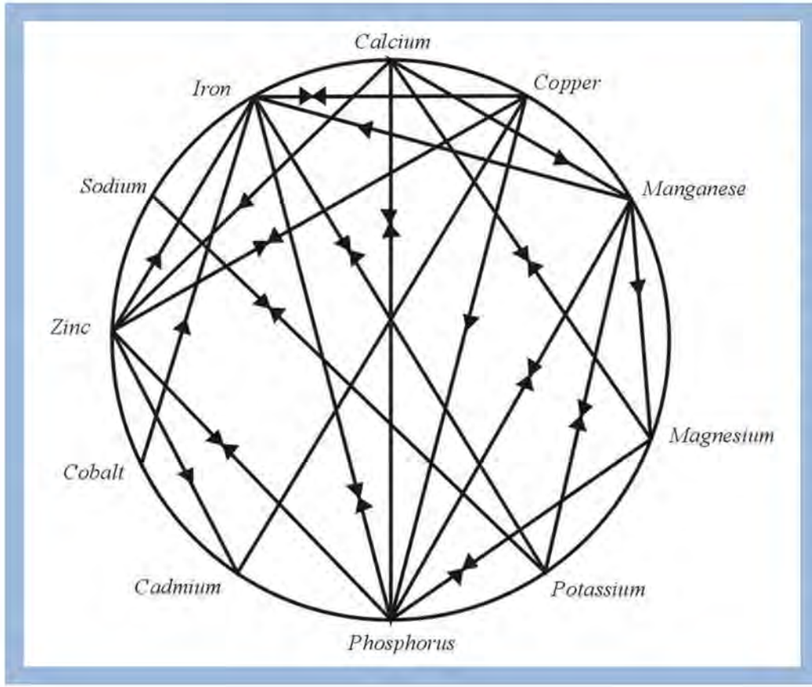


Figure 3-9: A mineral wheel illustrating the relationships between minerals within the soil is shown on the left. The location of the arrows represent the effect one mineral has on the availability to a plant of another mineral. For example, the absorption of zinc is dependent upon phosphorus, calcium, and iron. Higher levels of phosphorus inhibit the uptake of zinc but increase the availability of magnesium and so on. Many minerals rely on others to be present, which is why it is important to test soils before investing the money to implement a natural area. It may be difficult to add the necessary soil amendments after a planting has been installed without damaging the existing vegetation.

3.01.06 Miscellaneous Considerations

The following are recommendations, not requirements by the Village. Throughout a project there are many activities going on at the same time that may involve several different contractors, designers, regulators, etc. Prior to installing native seed or plants, it is advisable that the Applicant effectively communicate with the rest of the project team that they are going to begin native seeding/planting so that some of the common missteps can be identified and resolved prior to installation. If these issues arise, they typically result in the Applicant having to re-seed and/or re-plant, adding significant cost and time to the project. The Village has identified some of the common coordination issues below.

A. Stormwater Risers or Outfall Restrictors – Often during construction, the Applicant is required to install a temporary riser or restrictor in the outflow pipe of stormwater basins for sediment control during construction. Risers and restrictors will artificially raise the normal water level of a basin to allow soil in the stormwater to settle out prior to leaving the basin. This means that if the basin is designed to be dry-bottom it is common for it to consistently hold one or two feet of water while the riser/restrictor is in place. As you can imagine, if the bottom of a basin is seeded or planted prior to the restrictor or riser being installed/removed, the entire planting will be flooded and native species will drown. Talk with the project designers and contractors to ensure that all risers or restrictors are removed prior to seeding/planting and that they will not be replaced once the seeding/planting is complete.

B. Water Control Structures – The Village recommends that a water control structure be considered in wet-bottom and retention basins. Typically these structures have a locking mechanism that prevents tampering with the water levels. The Applicant should ensure that they and any other responsible parties have access to manipulate the structure and have final control over the water levels in the basin.

C. Filter Fabric – It is common for filter fabric to be temporarily installed inside of catch basin grates to filter sediment from soil-laden stormwater entering the grate during construction. These drainage structures then tend to drain much more slowly than originally designed and may impact the hydrology of the site. This is most commonly an issue when these structures are the main drainage outlet for a bioswale or rain garden feature, keeping them temporarily wet while the fabric is in place. The Applicant should ensure drainage structures are cleared of filters prior to seeding/planting.

D. Equipment or Vehicle Encroachment – Once an area has been seeded or planted, it is advisable for the Applicant to erect temporary fencing, barricades, signage, or some other structure to prevent other contractors working on the site from storing or driving equipment and vehicles into the native planting area. Unfortunately this is a common occurrence, particularly at the top of basin slopes where they abut lots, roads, or right of way areas.

E. Landscaping – Landscape Contractors often do not realize how some of their standard practices can negatively impact the development of the native planting areas. For example, a Landscape Contractor may lay turf grass sod on a lot adjacent to a detention basin, apply an herbicide that prevents weed seeds from germinating, and then begin running an irrigation system. The water running off of the sod, carrying the pre-emergent herbicide, will wash down the side slopes of the adjacent basin preventing germination of the native seed that was recently installed (Figure 3-10). More commonly, Landscape Contractors or homeowners apply a "weed-n-feed" fertilizer to their lawn and overspray into an established native planting. The herbicide in that application is a broadleaf herbicide and will kill all of the wildflowers that it contacts. It is in the best interest of the Applicant to ensure that the Applicant is in close coordination with the Landscape Contractor during construction and during ongoing maintenance.

F. Dumping – Throughout the construction process and once homes are occupied by residents, dumping of waste materials in the native planting areas may be an ongoing problem. Building Contractors may clean out their concrete trucks or dump excess gravel in native planting

Figure 3-10: Herbicide runoff from sod supressing native seed growth

areas. Homeowners may dump grass clippings and yard waste within native planting areas. Fencing, barricades, or signage may help prevent some dumping, but the Applicant should plan on regular site inspections so they can identify and remove any dumped materials before they can permanently damage the planting.

Natural areas take 3-5 years to develop, so they can appear weedy or unplanted to the untrained eye. An individual may think they are not hurting anything if they drive through the area or store their building scraps in an establishing natural area.

3.02 Seed Installation

Seeding is the main approach to large-scale native planting implementation because it is economical, though it does take three to five years before good establishment is achieved and requires the contractor to be experienced and knowledgeable in native plant development.

3.02.01 Installation Timeline

The time of year that native seed is installed for a native planting project is very important in determining a successful outcome. In comparison to traditional turf grasses that are cool season species, most native seed mixes contain both cool season and warm season species. In addition, many native plants produce seed that is initially dormant. Native seed dormancy is an adaptive trait, allowing germination to occur over time and during the proper season. This vital trait prevents the germination of all seeds at a time that might be suboptimal, or even lethal, for seedling establishment. Seed dormancy is broken through a process called "stratification" and usually consists of scarification (scratching of the seed coat to allow moisture penetration) or extended exposure to cold, moist conditions (over wintering). To help ensure optimal conditions for seed germination, the Village has provided the following minimum criteria for the timing of native seed installation. Alternative seeding timeframes must be approved by the Village Ecologist and may trigger additional requirements, such as irrigation or artificial stratification.

A. NON-STRATIFICATION SEED MIXES:
   1. Non-Stratification seed mixes are those consisting of 60% or more species by seed count that do not require cold moist stratification periods of 30 days or more.
   2. Optimal Installation Timeframe
      a. Spring: March 1st – June 30th
      b. Dormant: September 15th – October 31st

B. STRATIFICATION SEED MIXES:
   1. Stratification seed mixes are those consisting of 60% or more species by seed count that require cold moist stratification periods of 30 days or more.
   2. Optimal Installation Timeframe
      a. Dormant: November 1st – December 31st

C. GRASS MONOCULTURE SEED MIXES:
   1. Grass monoculture seed mixes are typically comprised of warm season grass species requiring 60-70° soil temperatures to germinate.
   2. Optimal Installation Timeframe
      a. June 1st – July 15th: Seeding during this period is required for germination and appropriate establishment. Consistent irrigation shall be provided.

3.02.02 Seeding Methods

A. All seeding and planting zones/locations shall be laid out and marked on the project site by the Applicant according to the plan. No seeds or plants shall be installed until the seeding and planting zones/locations have been approved in writing by the Village Ecologist.

B. *For Inter-Seeding into Existing Vegetation:* Seed shall be drilled by a modified* rangeland type no-till drill designed to plant native grass and forb seed (such as the Truax No-Till Drill, see Figure 3-11) if the soil is firm enough. Seed shall be drilled in at least two (2) separate runs where each application of seed shall overlap the previous application by one half (1/2) the weight to insure double coverage of seeded areas Each planting run shall overlap by a minimum of one (1) planting row. Some seed species require exposure to sunlight for germination, these species shall be planted separately, after drilling, utilizing the broadcasting method. [*Prior to seeding, detach the bottom portion of half (1/2) of the small box seeding tubes so that the seed is surface sown instead of drilled into the soil]

C. *For Newly-Graded Sites or Other Loose Soil Conditions:* Seed shall be drop-seeded by a rangeland type dropseeder designed to plant native grass and forb seed (such as the Belco Greenscape 600-4s Conservation Seeder, see Figure 3-11). Seed shall be installed in at least two (2) separate runs where each application of seed shall overlap the previous application by one half (1/2) the weight to insure double coverage of seeded areas Each planting run shall overlap by a minimum of six (6) inches. Some seed species require exposure to sunlight for germination, these species shall be planted separately, after dropseeding, utilizing the broadcasting method.
   ADD INSET BOX or FIGURE: Seed in a north to south direction at ten pounds per acre, then overlap by seeding in an east to west direction at ten pounds per acre, resulting in a total coverage of twenty pounds per acre (twenty pounds per acre is an example only, see Appendix A for actual project seeding rates).

D. If site conditions prohibit the use of mechanized seeding equipment, broadcasting of seed is acceptable on exposed

Figure 3-11: Beclo Greenscape Conservation Seeder


Figure 3-12: Seed Boxes

Rangeland dropseeders are the most effective method of seeding natural areas. They are equipped with seed boxes designed to hold different seed types and spread seed evenly in uniform rows over both newly graded sites or areas with existing vegetation. The seed planting rate can also be controlled to ensure excess seed is not wasted.


Figure 3-13: Uniform rows created by a Belco Greenscape Conservation Seeder


Figure 3-14: Hand Seeder


Figure 3-15: Hand Seeder

soil only. If seed is broadcast, it shall be mixed with an equal amount of inert filter (such as sand, vermiculite, rice hulls, etc.) to enable an even distribution of seed. A mechanical broadcast seeder may also be utilized, such as the Truax Seed Slinger (Figures 3-14 and 3-15). Seed shall be broadcast in at least three (3) separate applications unless otherwise approved by the Village Ecologist:

1. Broadcast half (1/2) of the specified native grass seed first. Drag the seeding area utilizing a rake or similar equipment, work native grass seed into the soil achieving a final planting depth between 0.25" (1/4") – 0.5" (1/2").
2. Broadcast remaining native grass seed, cover crop and one-third (1/3) of the remaining seed mixture (sedges/rushes/forbs), reserving 100% of any species indicated as "surface sown" in Appendix A. Drag the seeding area utilizing a rake or similar equipment, working the native seed into the soil achieving a final planting depth between 0.0625" (1/16") – 0.25" (1/4").
3. Broadcast remaining seed directly atop prepared seedbed. Do not drag or rake.
4. Depending upon the soil structure after preparation, this approach may require modification. On-site consultation with the Village Ecologist is highly recommended.

E. Seed shall not be sown in areas where standing water is present, during adverse weather, or when wind speeds exceed ten (10) miles per hour unless approved in writing by the Village Ecologist.

F. Hydroseeding of native seed is not acceptable. Hydromulch may be utilized as an erosion control method upon written approval by the Village Ecologist.

G. The Applicant shall roll seeded areas within 24 hours after seeding, or as soon as site conditions permit. The use of compaction wheels on the seed drill or cultipacker on the dropseeder is acceptable.

3.02.03 Erosion Control

Erosion control blankets are required anytime planting is conducted on bare soil or in highly erosive areas such as shorelines or drainage ways. Blankets used with native plantings shall be temporary biodegradable products made of straw, coconut fiber, or a combination thereof (Figure 3-17) and shall utilize biodegradable netting, such as North American Green S-75BN (or approved equal). Wildlife do not become entrapped in the biodegradable netting as easily as synthetic netting products. Excelsior wood fiber mats or permanent "Turf Reinforcement Mats" (TRM) shall not be used; excelsior mat products are not very compatible with broad leaved vegetation (wildflowers) and TRMs leave permanent thick plastic netting on the soil that will make supplemental seeding/planting efforts difficult if needed at a future date. The Village has provided the minimum criteria below regarding the use of erosion control blankets within native planting areas.

A. Erosion control measures shall be implemented immediately upon seeding completion. The **Director** may reduce erosion control requirements based on site conditions and/or planting.
   1. All seeded areas on newly graded sites shall include the installation of a temporary erosion control blanket, at a minimum use a single net straw blanket.
   2. All planting areas in direct contact with water (Normal Water Level of shorelines, swale bottoms, etc.) shall include the installation of temporary erosion control blanket, at a minimum use a double net straw blanket. (Figure 3-19).
   3. All shorelines from a minimum of three (3) feet above normal water level (NWL) to a minimum of one (1) foot below NWL shall include the installation of erosion control matting, at a minimum use a double net straw blanket.
   4. Shorelines adjacent to consistently flowing water shall be protected with coconut fiber erosion control logs along the toe of slope (Figure 3-20) and at a minimum use double net straw temporary erosion control blanket along the slopes.
   5. Alternate blanket types, applications or locations may be required as part of the Storm Water Pollution Prevention Plan (SWPPP). See SWPPP and engineering plans for additional blanket requirements.

B. Install all erosion control materials in accordance with the manufacturer's recommendation.

3.03 Plant Installation

Live plants establish more quickly than seed, but are more expensive and should be reserved to address specific situations where seed may not work or is not preferred. Situations best suited for plants include, but are not limited to: saturated soil or submerged soil situations where seeding is difficult or impossible, to establish species that have difficulty germinating from seed, or in a landscape situation where control over plant location is desired. Live plants can also be useful in diversifying established natural areas.

3.03.01 Timeframe

If possible, live native plants should be planted in the spring when temperatures are moderate and rainfall is more frequent. However, project schedules often change and installations occur and varying times throughout the growing season. Summer planting in June, July, or August is possible but will require supplemental watering until the plants become established. Fall planting is feasible as well as long as the installation occurs early enough to allow time for the roots to grow before the

Figure 3-16: Seed installation depth can not exceed 0.25" for successful germination

Figure 3-17: Hand seeding over a straw erosion control blanket

Figure 3-18: Plugs planted in erosion blanket

Figure 3-19: Erosion control blanket on a slope

Figure 3-20: Coir log being installed along a stream bank to hold grade

threat of frost.

A. Optimal Installation Timeframe
   1. April 1st – May 31st
B. Alternative Installation Timeframe
   1. June 1st –September 30th: Planting of live plugs during this period can only be conducted if consistent irrigation is provided.
   2. October 1st – March 31st: Planting of live plugs during this period can only be conducted if the shrink-swell potential of the soil is low.

3.03.02 Planting Methods

The most efficient way to install live native plants is to utilize a power auger, such as the one shown in Figures 3-21 and 3-22. The auger can be used to install plants through erosion blanket if done with care, however utilizing the sharp end of a pick axe to puncture the blanket and create a planting cavity is typically more effective. The most inefficient method of plant installation is by using hand tools, such as planting trowels or shovels. The Village has established the minimum criteria for native plant installation below.

A. Live plug planting densities will vary according to project budget and project goals.
   1. Shorelines shall include planting within the "safety shelf" a minimum of five (5) live native plugs per linear foot of shoreline and shall be distributed from 6" above Normal Water Level (NWL) to 4-5' out from NWL.
   2. Live plugs shall be installed in full or half flats, creating drifts or groupings of the same species rather than planting all species intermixed randomly across the site. Plant spacing within each grouping will depend upon the species being planted, but shall be restricted to a minimum of 18" on center (OC) unless otherwise approved in writing by the Village Ecologist.
   3. Live plugs shall be installed in holes drilled with an auger with the same diameter and depth as the live plug's root massing (within +.75"/-.25"). In wetland and shoreline plantings where soil is soft and moist enough, a dibble bar or trowel may be used to create planting holes. Avoid severely damaging erosion control mat during plug planting operations.
   4. Live plugs shall be inserted into the hole so that the final position of the root crown following planting, soil settlement, and initial watering is slightly below the soil surface (1/8 – 1/4 inch). All crowns shall be covered with soil.
   5. Live plugs shall not be loose after planting. In wetland or shoreline areas with the potential for high wave action, or highly fluctuating water levels that may dislodge newly planted live plugs, plugs shall be secured with 6-8 inch "U"-shaped wire erosion control blanket staples. Staple length shall be determined by the density of the planting substrate; softer substrates require longer length to hold plugs adequately.
   6. Each live plug shall be flooded with approximately 50 ml of water after insertion into the ground.

3.03.03 Herbivory Protection

Herbivory must be kept in mind when planting native plants, particularly when installing them in close proximity to water. Native plantings are often damaged by waterfowl, muskrats, or by rough species of fish like carp. Exclosure netting can be erected to effectively keep waterfowl away from newly planted areas (Figure 3-23). The Village has established minimum criteria for waterfowl exclosures below.

A. Waterfowl exclosures shall be erected around all live native plants that have been planted in areas where there is a potential for herbivory by waterfowl (especially geese), such as retention basins or other planting areas adjacent to open water. Install goose exclosure fencing in 100' – 200' lengths, leaving 4-6' wide openings between exclosure ends to allow access to the water for people and other wildlife during the establishment period.
   1. Steel T-posts shall be installed at twelve (12) feet on-center (maximum). Drive posts into the ground so that the exclosure will extend at least two (2) feet in height above the tops of planted live plugs.
   2. Black UV stabilized poultry netting shall be secured to the steel T-posts with plastic zip-ties.
   3. Nylon rope shall be attached to the top of steel T-posts in a zigzag pattern to prevent aerial landings by waterfowl.
   4. The Applicant shall disassemble and remove all waterfowl exclosures from the project site after two (2) complete growing seasons. The Village Ecologist may request removal of the exclosure prior to the two (2) year term ending.
   5. The Applicant shall maintain the exclosure in a functional and aesthetic condition. The Applicant shall make all required, reasonable repairs and/or replacements within 72 hours of being notified by the Village Ecologist.
B. Additional protection measures may be required to protect shoreline and wetland plantings from herbivory or damage, particularly by muskrats and carp. Waterfowl exclosures are typically not effective against other types of herbivory or damage. If muskrats present a problem they need to be trapped prior to causing severe damage (Figure 3-24). If carp present a problem a fish kill and/or benthic mesh should be considered. Herbivory or damage of plant material by wildlife shall not relive the Applicant from meeting the performance criteria, unless approved in writing by the Village Ecologist.

Figure 3-21: Power auger efficiently drills holes

Figure 3-22: Carefully instert plugs into holes by hand and fill in with soil as needed

Figure 3-23: Goose Exclosure

Figure 3-24: Damage caused by muskrats

SECTION 4

MAINTENANCE GUIDELINE

Maintenance of native plantings during the establishment period and beyond is critical to achieving and maintaining an ecologically diverse and attractive natural area. In an effort to establish conforming and successful native planting areas that are attractive to the community and beneficial to the environment, the following section outlines the minimum baseline design criteria that should be followed when developing maintenance plans and specifications.

VILLAGE OF LEMONT

4.01 Maintenance Plan

Anyone wishing to use native plantings in their project must submit a short-term (Minimum 3 years after planting) and long-term maintenance and monitoring plan to the **Director** for review and approval. The Village has provided the following information and minimum criteria for inclusion into any native planting maintenance plan.

4.01.01 Establishment Maintenance Plan

The first three to five years of native planting maintenance is the most critical. It is during this time that a native planting will require the most intense and rigorous maintenance schedule. Figure 4-2 represents an example of a typical establishment maintenance activity schedule. During establishment, native plantings will require seven or more maintenance visits each growing season. The overall goal of the establishment maintenance plan should be to control weeds by not letting them reproduce, thereby reducing competition with the native plants for light, water and nutrients. It is imperative that the field crew have an understanding of a plant's life cycle so the appropriate maintenance strategy can be employed (Figures 4-3 and 4-4).

A. Life Cycle – The life cycle of various weedy plants dictates how to manage them. Some plants bloom early in the year and may need to be controlled in March and April, while others are best controlled in early fall, or even during the winter. In addition to the blooming period, knowing whether a plant is an annual, biennial, or perennial will guide effective management.

1. **Annual Species** – Many common weed species are annuals, meaning they germinate from seed, grow, reproduce, and die all within one year Examples of annual weed species include foxtail, ragweed, and chicory. Mowing or hand pulling just before or while the plant is in flower is generally sufficient to control these species. Annuals take advantage of disturbance and can be expected to be heavily populated in a new planting, however they are not great competitors and will not be as big of a problem in the later years of a restoration project.
2. **Biennial Species** – Other weeds are biennial, meaning they germinate from seed and generally have only basal leaves (low to the ground) without flowers during the first year of growth. The second year, a mature plant is produced which flowers, reproduces, and dies. Examples of biennial weeds include Queen Anne's lace (also known as wild carrot), yellow and white sweet clover, and garlic mustard. These plants may be treated with herbicide or hand-pulled (with the root included) in growth year one or early in growth year two, however any individuals that are not treated should be mown or otherwise removed just before or while the plant is in flower to ensure that it does not develop and distribute viable seed.
3. **Perennial Species** – The most tenacious weeds are perennial; they bloom and produce seed year after year, storing energy in their roots over winter. Examples of perennial weeds include Canada thistle, cattails, most turf grasses, and curly dock. Herbicides are the best way to treat perennial weeds. Alternatively, perennial weeds may be hand pulled, but only if the entire root system is removed. Even if a perennial weed is cut back to the ground during the growing season, it typically contains enough energy in its roots to continue to grow year after year. Some invasive species such as Canada thistle spread by underground rhizomes (roots) and will continue to colonize even if mown and not allowed to set seed. Any perennial weeds that are not treated should be mown just before or while the plant is in flower to ensure that it does not develop and distribute viable seed.

4.01.02 Long-Term Maintenance Plan

Once a native planting area becomes established it will begin to out-compete many of the common annual and biennial weeds, though more aggressive weeds/invasive species will continuously be a threat to the health and aesthetic of any native planting area. Therefore it is the desire of the **Director** to ensure that any native planting area established within the Village of Lemont has a plan and an identified funding source for appropriate active management in perpetuity. Long-term native planting management strategies and responsible parties must be identified prior to approval of development plans proposing to use native plantings.

4.02 Maintenance Criteria

4.02.01 General Information

A. Stewardship shall begin immediately after planting and continue for three (3) growing seasons or until Final Acceptance by the Village Ecologist.

B. The Applicant shall keep a log of all restoration activities

Figure 4-1: Highly diverse and functioning natural area

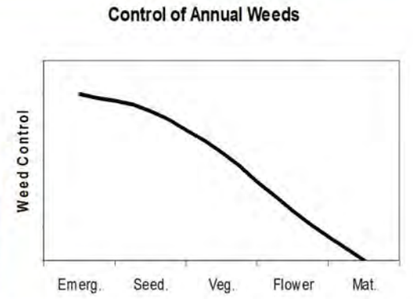


Figure 4-3: Annual weed control timeline

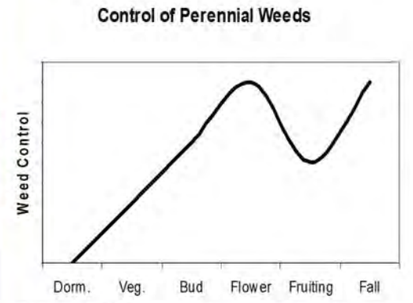


Figure 4-4: Perennial weed control timeline

Month	Visits by Crew	Herbicide	Brush Clearing	Mow	Collect/Disperse Seed
April	0-1	X	X		
May	1-2	X	X	X	X
June	1-2	X		X	X
July	1-2	X		X	
August	1-2	X		X	
September	0-1	X		X	
October	1-2	X	X	X	X
November	0-1	X	X		X
December through March	0-1	X	X		X

Figure 4-2: Suggested maintenance activities and reccommended timeframe for natural areas

performed during contract period, installation through stewardship, and shall submit it to the Village Ecologist on a monthly basis.

C. Chemicals used will have the lowest environmental impact for the task at hand. Organic or cultural practices will be used whenever practical.

4.02.02 Native Planting Mowing

A. All mowing shall be conducted in accordance with all applicable codes and by personnel with appropriate training in safety and in the use of the machinery being utilized.

B. Mowing is a key aspect in achieving positive results. Mowing must be conducted by the Applicant on a consistent basis and must respond to seasonal weather. Vegetation shall be high-mown as follows:

1. First Growing Season: Native plantings shall be kept under twelve (12) inches. The **Director** recommends that the Applicant budget for a minimum of five (5) mowings.
2. Second Growing Season: Native planting areas shall be spot mown targeting non-native/weedy species. If non-native/weedy species are dominant, native planting areas shall be kept mown at under eighteen (18) inches. The **Director** recommends that the Applicant budget for a minimum of three (3) mowings.
3. Third Growing Season: Native planting areas shall be spot mown targeting non-native/weedy species. If non-native/weedy species are dominant, native planting areas shall be kept mown at under eighteen (18) inches.

C. Mowing shall commence during late May/early June and subsequently four weeks apart or any time a large number of weed species begin to flower. Mowing shall be timed in a manner that prevents viable seed from being produced on site. Some species are able to develop viable seed when they are cut late in the flowering period.

D. Mowing shall be conducted with a conventional rotary mower, sickle type mower, or a flail type mower. To reduce thatch, at no time shall more than six (6) inches (height) of vegetation be cut in a pass. Applicant shall ensure that cut materials are not allowed to drop seed or smother desired vegetation.

E. On slopes that are too steep to mow, around structures (trees, fencing, buildings, etc.), and in areas that are too wet to mow, mowing shall be conducted with the use of a hand-held brush cutter or weed-whacker only. Damage caused to landscape material or other structures shall be repaired/replaced by the Applicant.

4.02.03 Herbicide Applications

A. Spot Herbicide Applications

1. Small scattered populations or individual specimens of undesirable species shall be controlled with spot herbicide applications. Large-scale colonization shall not be allowed.
   a. Backpack Spray Treatments – Applicant shall utilize a 3-5 gallon backpack style sprayer, such as Solo, SP3, Field King or acceptable substitution (Figure 4-5).
   b. Hand-wicking – In areas of high quality native vegetation where desirable species are directly adjacent to targeted plants, or where the growth habit of the target plant makes it impossible to avoid off-target damage, the appropriate herbicide shall be selectively hand wiped onto the target plant utilizing a sponge-wicking applicator or a saturated cloth glove (Figure 4-6).
2. Site preparation and planting after herbicide applications shall be as per this document.

B. Broadcast Herbicide Applications

1. On larger sites where a broad-scale application is needed because large colonies of the target species have become established, broadcast applications by large tank-equipped spray-gun, all-terrain vehicle (ATV) or tractor may be utilized to treat undesirable species. The following methods are appropriate:
   a. Broad-Spectrum Herbicide Broadcast Application – This method uses a large tank-equipped spray-gun and/or an ATV or tractor equipped with a boom-sprayer to apply large amounts of glyphosate, which will result in complete kill of all vegetation.
   b. Selective Herbicide Broadcast Application – This method utilizes a large tank-equipped spray-gun and/or an ATV or tractor equipped with a boom-sprayer to apply large amounts of a selective herbicide, such as Ornamec, resulting in a complete kill of only those targeted species (in this case, grasses)
2. A "large colony of target species" shall be defined as a target plant population whose aerial coverage is such that a broad-spectrum chemical can be broadcast while inflicting little damage to adjacent native vegetation.
3. Site preparation and planting after herbicide applications shall be as per this document.

Figure 4-5: Herbicide application using backpack sprayers

The Village requires that all herbicides use a marker dye, such as Signal®, when applied in native planting areas to enable tracking of the application. The only exception is when applying herbicides within three feet of a roadway, sidewalk, structure or other feature where dyes may cause staining damage (staining should be temporary).

Figure 4-6: Gloves used for hand wicking

Target Species	Herbicides	Initial Herbicide Application	Follow-up Herbicide Application
Reed Canary Grass *(Phalaris arundinacea)*	Sethoxydim* Aquatic Glyphosate	April 1st-May 31st	October 1st-Dormancy/Frost
Teasel Species *(Dispsacus spp.)*	Triclopyr 3a*, Glyphosate	April 1st-May 31st	October 1st-Dormancy/Frost
Sweet Clover Species *(Melilotus spp.)*	2, 4-D*, Clopyralid	April 1st-May 31st	October 1st-Dormancy/Frost
Cattail Species *(Typha spp.)*	Aquatic Imazapyr	July 1st-August 1st	Use Clopyralid as needed throughout growing season
Purple Loosestrife *(Lythrum salicaria)*	Triclopyr 3a*, Aquatic Glyphosate	May 15th-July 15th	August 1st-September 1st
Non-native Thistle Species *(Carduus, Cirsium, & Onopordum spp.)*	Clopyralid	May 15th-July 15th	July 15th - August 15th
Common Reed *(Phragmites australis)*	Aquatic Imazapyr	August 1st-September 1st	September 1st - September 30th
Honeysuckle Species *(Lonicera spp.)*	Triclopyr 3a (Foliar Application)	May 15th-July 15th	July 15th-August 15th
	Glyphosate (Cut-Stump/Basal Bark Application)	November 15th-March 15th (During Dormancy)	Follow-up should be Foliar
Other Woody Species (Includes *Rhamnus spp.*)	Triclopyr 3a (Foliar Application)	May 15th-July 15th	July 15th - August 15th
	Triclopyr 4e (Cut-Stump/Basal Bark Application)	November 15th-March 15th (During Dormancy)	Follow-up should be Foliar

Figure 4-7: Herbicide application table by species

C. Herbicide Application Timing

1. Herbicide applications must be conducted by the Applicant on a consistent basis and must respond to seasonal weather and to the life cycle of each target species (Figure 4-7). Based upon the known life cycle of the most common non-native species that appear during restoration and the appropriate timeframes to conduct initial herbicide applications and follow-up applications, the **Director** recommends that the Applicant budget for a minimum of seven (7) herbicide applications each growing season.

4.02.04 Hand Weeding

Hand weeding is simply removing by hand individual undesirable plants. Hand weeding will be necessary for maintaining native planting areas just as it is necessary for maintaining landscaped areas (Figure 4-8). Annual and second-year biennial weeds are often best controlled via hand weeding because their root systems are not as well-developed as perennial weeds, so they are easily pulled from the ground. It is often best to hand weed after a rain, when the roots are easily pulled from the ground. Hand weeding should be carefully performed (or not at all) in newly seeded areas to avoid further disturbance to the soil. Hand weeding is typically conducted in concert with herbicide applications.

A. In the event that herbicide applications cannot, or should not, be performed due to social, cultural, environmental, or other verified reasons, target weed species shall be removed by hand.

1. Species targeted for complete hand weeding shall include removal of all plant parts from the soil, including the above ground growth and all roots or rhizomes present in the ground.
2. Species targeted for partial hand weeding shall include removal of plant reproductive parts (i.e. seed heads). Partial hand weeding shall be conducted in concert with, or shall be followed up with herbicide applications.
3. Removed vegetative materials shall be discarded off-site or left on-site in a manner that will not allow regeneration or seed set of the removed species. Some species such as garlic mustard may set seed even after being removed from the ground while flowering. These species must be removed from the site. Transportation of removed vegetative materials shall meet Department of Agriculture standards/requirements.
4. Hand weeding shall never result in excessive soil disturbance.
5. If hand weeding is necessary, it shall at a minimum be conducted in the same intervals as is required for herbicide application timing.

4.02.05 Treatment of Woody Species

A. The Applicant shall conduct woody species herbicide treatments to all re-sprouts, re-growth, or other remaining live plants of all non-native or aggressive native woody species throughout stewardship operations until performance criteria have been achieved (See Section 5).

B. Woody species treatment methods during the growing season may be a foliar application using an appropriate herbicide, such as Garlon 3a (Figure 4-9). Damage to surrounding vegetation due to re-sprout treatments shall be repaired by the Applicant.

C. Woody species herbicide treatments during the dormant season may be applied with cut-stem and/or basal bark application using an appropriate herbicide, such as Garlon 4e. Damage to surrounding vegetation due to re-sprout treatments shall be repaired by the Applicant.

1. Hand Cutting/Cut-Stump Treatment: Chain saws, brush clearing saws, handsaws, and loppers may be used (Figure 4-10). Upon written approval by the Village Ecologist, small walk behind mower-type brush cutters may be used provided that their use does not result in rutting or pitting of the soil while in operation.
   a. Cut woody target species shall be treated with an herbicide mixture. After cutting down the target species apply herbicide, such as Garlon 4e in a 20-30% (or as stated on the product label) solution in basal oil, to the stump. *Lonicera spp.* shall be treated with Roundup in a 25-50% solution, to the stump. Treat the cut area around the edge with herbicide so the cambium layer will take up the active ingredient. Herbicide shall be applied immediately after cutting.
2. Basal Bark: Involves herbicide application directly to the trunk of the woody target species that are one inch or less at the base. Herbicide shall be applied directly to the tree trunk, around the entire circumference, at six inches (6") above the soil until thoroughly wet near the ground plane, but not to the point of runoff. Application shall occur during dormancy, except when snow or water prevents spraying to the ground plane. Optimal results are achieved when applications are made to young stems which have not developed thick bark.

D. Wherever possible herbicide applications shall be accomplished by utilizing wick or sponge-type

Figure 4-8: A Natural areas maintenance crew hand pulling weeds

Figure 4-9: Basal bark treatment

Figure 4-10: Hand cutting invasive brush with chainsaws and appropriate safety gear

Figure 4-11: Stump treatment with sponge

applicators (Figure 4-11).

E. All cuttings longer than two feet (2') in length or larger than one inch (1") in diameter shall be removed from the project site or burned on site. Smaller cuttings and debris from shredding or chipping may be left on site to decompose or to be consumed by prescribed fire (if applicable). Cuttings and debris shall not be allowed to accumulate to a depth that will smother existing desirable native species, prevent existing desirable native species from emerging, or prevent appropriate seed-to-soil contact in newly seeded areas (approximately one-half inch maximum depth).

F. When working within woodland areas or areas that contained significant brush and tree removals as part of the original restoration, the **Director** recommends that the Applicant budget for a minimum of three (3) woody re-sprout treatments each growing season

4.02.06 Landscape Bed Maintenance

All landscape beds that occur within designated natural areas shall be maintained by the Applicant. This includes all trees, shrubs, and perennial beds (Figure 4-12). The Village has provided the minimum criteria below related to regular maintenance of Landscape Beds within all natural areas.

A. General

1. Tree rings and/or other areas of non-lawn landscape containing plants within designated management areas shall be considered a "Landscape Bed" for the purposes of this document.

B. Mulch Management

1. Landscape beds shall receive a new mulch dressing by May 1st of each growing season. Mulch dressing shall be applied at a minimum of one (1) inch thick.
2. Landscape bed mulch shall be turned over a minimum of four (4) times per growing season.

C. Edging

1. Landscaped beds and tree rings shall be edged during the first maintenance visit and as otherwise necessary throughout each growing seasons. The **Director** recommends that the Applicant budget for a minimum of three (3) landscape bed and tree ring edging occurrences each growing season (Figure 4-13).

D. Pruning and Dead-Heading

1. Shrubs, ornamental trees, and qualified canopy trees shall be assessed/pruned a minimum of three (3) times per growing season to remove dead or damaged branches, to develop a natural form and improve the health of the plant. Qualified canopy trees shall be those three (3) inches DBH or smaller.
2. Spent flower heads of perennial flowering plants shall be removed a minimum of three (3) times per growing season.
3. All herbaceous plant material (flowers and grasses) shall be cut back to ground level and removed from the site by November 30th of each growing season, or as otherwise agreed to in writing by the Village Ecologist.

E. Hand Weeding

1. In the event that weed content exceeds a height of four (4) inches and/or herbicide applications cannot, or should not, be performed due to social, cultural, environmental, or other verified reasons, target weed species shall be removed from landscape beds by hand.
   a. The **Director** recommends that the Applicant budget for a minimum of six (6) hand weeding applications within landscape beds each growing season.
   b. Species targeted for complete hand weeding shall include removal of all plant parts from the soil, including the above ground growth and all roots or rhizomes present in the ground.
   c. Species targeted for partial hand weeding shall include removal of plant reproductive parts (e.g. seed heads). Partial hand weeding shall be conducted in concert with, or shall be followed up with herbicide applications.
2. Hand weeding of landscape beds shall occur as often as necessary to ensure that landscape beds appear tidy and weed-free.
3. Removed vegetative materials shall be discarded off-site or left on-site in a manner that will not allow regeneration or seed set of the removed species. Transportation of removed vegetative materials shall meet Department of Agriculture standards/ requirements. Hand weeding shall never result in excessive soil disturbance. For highly visible public sites the Village Ecologist reserves the right to direct the Applicant to collect and dispose of all hand-pulled vegetation off site.

4.02.07 Over-seeding and Re-Planting

Over-seeding or re-planting may be necessary for compliance with the performance section of this document. Follow the criteria for seeding or planting as per this document.

4.02.08 Seed Collection & Distribution

Once a natural area becomes established, seed collection and distribution should become a regular part of the management

Figure 4-12: Maintained Native Landscape

Figure 4-13: Distinct landscape bed edge

Figure 4-14: Seed collection

Figure 4-15: Native seed

Figure 4-16: Volunteers assisting with native seed collecting and dispersing

plan (Figures 4-14 and 4-15). Native seed should be collected at appropriate times for each species. Disperse collected seed over the site after a spring or fall clean up or after conducting prescribed fire to improve density or biodiversity. Collected seed can also be seeded in bare spots caused by natural disturbance, repairs, or herbicide applications.

Seed collection and distribution is a great volunteer activity. Offering volunteer opportunities encourages the surrounding community to become more engaged in the establishment of the natural area (Figure 4-16).

4.02.09 Prescribed Fire

Fire was a frequent part of pre-settlement native ecosystems and maintained the integrity of natural areas. Fire stimulates plant growth, prevents unwanted brush encroachment, and recycles nutrients. While fire was historically caused by lightning strikes and used by Native Americans, fire suppression post-European settlement allowed brush to invade open prairies and woodlands, shading out many sun-loving plants. In native planting management, prescribed fire is one of the most efficient and inexpensive ways to renew and protect our natural areas while simultaneously increasing site aesthetics.

Newly seeded areas should be allowed to establish for 2-3 growing seasons prior to prescribed fire application. Prescribed fires are typically conducted between the months of November and April, however the Village prefers that burning be conducted in the fall to promote better wildflower production and to minimize the impact on nesting birds and other animals. We recommend that when areas become burnable that the entire area be burned annually for 5-7 years to aid in plant establishment. Once the area is well established, an alternating burn schedule can be implemented if desired, doing so maintains unburned areas as wildlife refuge.

Prescribed fire should be conducted by highly trained personnel with appropriate permits and following an approved burn plan (Figure 4-17). The Village has provided minimum criteria regarding prescribed fire below.

A. GENERAL

1. Prescribed fire may be employed as a native planting management tool with written authorization from the Village Ecologist and is contingent upon attainment of all required permits by the Applicant.

B. PERSONNEL/TRAINING

1. It is required to have highly trained and experienced employees working on a prescribed fire (Figure 4-18). The Applicant must meet the requirements as per this document; documentation of fully trained and experienced personnel shall be submitted to the Village Ecologist prior to approval.
2. Refresher courses for NWCG levels are required annually. To maintain certification individuals need to have completed the S130/S190 courses (once), pass at least a moderate level pack test (carry forty-five (45) pounds three (3) miles in forty-five (45) minutes), and attend a yearly one-day refresher course. Documentation that certification maintenance training for all proposed burn crew members has been completed shall be submitted to the Village Ecologist prior to approval. Refresher courses for other NWCG positions vary.
3. Burn plans shall be written/reviewed and approved by the burn boss.
4. The National Wildfire Coordinating Group (NWCG) standards shall be followed for prescribed fire.

C. EQUIPMENT

1. The Applicant shall have in their possession the following equipment prior to plan approval unless otherwise agreed upon by the Village Ecologist:
   a. Two type 6 engines
   b. Two type 7, 6 wheel drive ATV engines
   c. One 500 gallon water tender
   d. One fire pump capable of delivering sufficient water pressure at 1000 feet to suppress an escaped fire
   e. 1000 feet of collapsible 1" fire hose with nozzles
   f. Two-way radios for all personnel involved in the fire, whether on the line or not (one [1] additional radio may be required for Village Ecologist to monitor activity)
   g. All necessary personal protective equipment for all personnel to meet NWCG guidelines

D. INSURANCE

1. The Applicant shall provide the **Director** with a certificate of insurance and name the Village of Lemont as additional insured.
2. The Applicant shall maintain insurance coverage for at least $5,000,000.00 (five million) dollars of general liability insurance and excess general liability for "Prescribed Fire Operations" with a minimum $2,000,000.00 (two million) per occurrence limit.
3. The Applicant shall list prescribed fire on the certificate as the activity is covered.

Figure 4-17: Prescribed fire being executed by trained professionals with appropriate equipment

Figure 4-18: Only trained personnel with proper safety equipment can work on burn sites

Figure 4-19: Proper safety signage

E. ROADSIDE VISIBILITY MATERIALS

1. Roadside visibility materials are essential if the fire is near a roadway. Applicant shall provide and install temporary warning signage along all roadways bordering the burn unit (Figure 4-19). Warning signage shall be visible by road traffic and shall display the Applicant's contact information. All signage on public roadways shall conform to all applicable local and Illinois DOT signage specifications.
2. Stop/Go paddle
3. Construction cones
4. All personnel participating in a prescribed fire within close proximity of a roadway shall wear appropriate reflective work vests.

F. BURN PLAN

1. Prior to burning, the Applicant shall complete and submit a burn plan for approval by the EPA, the Village Ecologist and any other agencies with jurisdiction.
2. Because of the large degree of variation in the complexity of prescribed burns, there are no standardized burn plans, only standardized information. A burn plan can be short or long, depending on the complexity of the proposed burn and the desires of the ecologist/burn boss. At a minimum, the Village requires the following information be included in the burn plan:
   a. The location of all smoke sensitive sites, including but not limited to schools, daycares, recreation centers, senior centers, and healthcare offices or facilities within one mile of the proposed burn site's perimeter shall be documented on a site map.

G. PERMISSIONS/PERMITS

1. The Applicant shall gain permissions and permits from all applicable federal, state, county, and local agencies and government entities prior to burning.

H. PUBLIC NOTIFICATION

1. The Applicant shall notify adjacent neighbors in writing that a prescribed burn will be taking place and shall include an anticipated schedule. The notification must include the Contractor's phone number and an invitation to be added to a notification call list. Contractor will be responsible for notifying anyone on the notification call list 24 hours in advance of the burn.
2. The Applicant shall contact any identified smoke sensitive sites in writing and by phone at a minimum of two weeks prior to the scheduled burn and again 24 hours in advance of the burn.
3. The Applicant shall notify the Director and the Village Ecologist 48 hours in advance of the burn.

I. EXECUTION

1. The prescribed fire shall be executed in accordance with an approved burn plan.
2. The Applicant shall mop up all burning material to 100% black after the main fire has passed. There shall be no burning materials when the Applicant leaves the site.
3. The Applicant shall be available to return to the site within 2 hours following mop up operations to extinguish burning materials. The person selected to return to the site must have access to all crew members in the event that they must be re-deployed to the project site.

4.02.10 Burn Piles

When removing trees and invasive brush for the purposes of native planting, disposal of removed materials may be achieved through burning with written approval by the Director and acquisition of all necessary permits by the Applicant. Whenever burning is used for brush and tree removal the following shall apply:

A. All of the requirements for Prescribed Fire as per this document shall also apply to burn piles.
B. To prevent soil sterilization within the restoration unit, burn piles shall occur on constructed platforms while the ground is frozen. Platforms shall be metal, elevated a minimum of eight inches (8") high and shall be constructed on flat ground (Figure 5-20).

Figure 5-20: Burn platforms are often utilized to protect native herbaceous material that may be dormant but still present

Figure 5-21: Example of fire exclusion

SECTION 5

PERFORMANCE CRITERIA & MONITORING

Measuring success of a native planting can prove difficult, however it is critical to define what success looks like to ensure consistent, high-quality installations. In an effort to establish conforming and successful native planting areas that are attractive to the community and beneficial to the environment, the following section outlines the minimum baseline performance criteria and monitoring efforts that should be included in all native planting plans and specifications.

VILLAGE OF LEMONT

5.01 Performance and Village Acceptance

Performance criteria, also known as performance standards, define whether or not a project has been successful in meeting certain goals or the project's intent. The goals can be different for each project and may include creating habitat for wildlife, improving plant biodiversity, increasing stormwater holding capacity, decreasing nutrient loading into local water systems, or improving public space aesthetics. There is no perfect, one-size-fits-all system for measuring success in native planting establishment. In addition to traditional performance criteria based upon monitoring data, the Village also requires each Applicant to meet the intent of this document as detailed below.

5.01.01 Stated Intent within Native Planting Areas

A. Brush and tree clearing priorities are to approach eradication of invasive woody species and thin existing stands of native woody species. The intent is to allow sunlight to penetrate the ground and eliminate threats from invasive species or aggressive native species, while protecting existing trees to remain from damage.
B. Native planting priorities are to prepare planting areas for good seed-to-soil contact, install an even coverage of high-quality native seed/plants, and protect planting areas from erosion. The intent is to develop a dense stand of native vegetation with minimal weed content.
C. Native planting management priorities are to approach eradication of invasive and weedy species, establish and encourage the healthy growth of native species, and increase overall site biodiversity. This document describes the standards for acceptance, monitoring, reporting, performance, and remediation for a successful management program. The intent is to develop a dense stand of desirable native species with minimal weed content and no threat from invasive species or aggressive native species.
D. Prescribed fire priorities are to achieve specific ecological and/or aesthetic outcomes through the safe application of fire under a comprehensive prescription without causing damage to structures, property, cultural resources, desirable woody vegetation, desirable deadwood, desirable fire-negative herbaceous species, or other desirable features. The intent is to clear standing dormant herbaceous biomass and/or leaf litter so that sunlight can penetrate to the soil surface and that other management tasks can be performed more efficiently.

5.01.02 Performance Criteria

A. At no time throughout management activities shall aggressive native species, non-native species, nor invasive/exotic species be allowed to become established on the site and/or be allowed to colonize. Here "establish" means that the species is allowed to grow, thrive, and reproduce.
B. Within three (3) months of seed installation, the total vegetation cover in all areas seeded with cover crop shall be greater to or equal than seventy-five percent (75%) as measured by general visual assessment. If seed installation is completed in the fall, this standard shall be met by June 1st of the following year.
C. Goals for the end of the first growing season
    1. Twenty-five percent (25%) of the native species installed via seed shall be alive and apparent.
    2. None of the dominant species within the seeded areas shall be invasive/exotic species (See Appendix D).
    3. No less than eighty percent (80%) of any live native herbaceous plant material installed shall be alive and in vigorous condition. If less than eighty percent (80%) of any live native herbaceous plant material installed survive the first full growing season, the plants shall be replaced so that the eighty percent (80%) criteria is achieved.
D. Goal for the end of the second growing season, in addition to fulfilling the above:
    1. Fifty percent (50%) of the native species installed via seed shall be alive and apparent.
    2. Native cover within the seeded area(s) shall be at least fifty percent (50%), but shall not be dominated with aggressive native species including, but not limited to Ragweed (*Artemesia spp.*), Horsetail (*Erigeron canadensis*), Foxtail (*Alopecurus spp.* & *Setaria spp.*), Cottonwood (*Populus deltoids*), Box Elder (*Acer negundo*), Sandbar Willow (*Salix interior*), Cattails (*Typha spp.*), Barnyard Grass (*Echinochloa crusgalli*), etc.
E. By the end of the third growing season, in addition to fulfilling the above:
    1. For each planting zone, seventy-five percent (75%) of the native species installed via seed shall be alive and apparent. None of the dominant species within the planting zone(s) shall be non-native or invasive/exotic species (See Appendix "A"). Native cover within the planting area(s) shall be at least eighty percent (80%), but shall not be dominated with aggressive native species including, but not limited to Ragweed (*Artemesia spp.*), Horsetail

Figure 5-1: A healthy and functioning natural area with high diversity that meets performance criteria

(*Erigeron canadensis*), Foxtail (*Alopecurus spp.* & *Setaria spp.*), Cottonwood (*Populus deltoids*), Box Elder (*Acer negundo*), Sandbar Willow (*Salix interior*), Cattails (*Typha spp.*), Barnyard Grass (*Echinochloa crusgalli*), etc.

2. There shall be no area(s) greater than 0.25 m^2 that are devoid of vegetation.
3. There shall be no rills or gullies present throughout the project area.
4. The following FQA standards shall be achieved:
    a. Based on the results of the meander survey, the goal is to have the Native Mean C-value increase each successive year after planting.
    b. Based on the meander survey, the goal is to have the Native FQI increase each successive year.
    c. By the end of the third growing season, each planting zone shall achieve or exceed the following FQA values (See Figure 5-4 for standard mix performance criteria calulations) :
        i. Native FQI – 21.0
        ii. Native Mean C Value – 3.5
        iii. The Native Mean W within any wetland zone shall be less than zero.

5.01.03 FORMAL ACCEPTANCE CRITERIA

A. At least five (5) days prior to the desired date of inspection, the Applicant shall submit a written request for inspection to the Village Ecologist.
B. Final Acceptance: The work shall be considered 100% complete after the year three performance criteria have been satisfied.

PERFORMANCE CRITERIA CALCULATIONS FOR STANDARD MIXES (APPENDIX A)				
Species List	Native FQI	Total FQI	Native Mean C Value	Total C Value
Buffalo Grass Lawn Seed Mix	0	0	0	0
Transitional Buffer Seed Mix (Dry-Mesic Soils)	5.7	3.4	4.0	1.8
Transitional Buffer Seed Mix (Mesic-Wet Soils)	7.5	4.5	3.8	1.7
Low Profile Prairie Seed Mix	37.6	22.6	6.0	2.7
Dry Bottom Detention Basin Seed Mix	31.3	18.8	4.8	2.2
Wetland Seed Mix	34.4	20.6	5.1	2.3
Emergent Seed Mix	28.5	17.1	5.5	2.5
Shoreline Plug Mix	30.2	18.1	5.9	2.7

Figure 5-2

5.02 Monitoring and Reporting

Natural areas monitoring is a helpful and necessary tool to track the progress of a native planting, restoration or the health of an established natural area. The results of monitoring can inform future management actions by providing information on native and invasive species presence and coverage, herbivory, erosion, hydrological, wildlife, or aesthetic issues. The Village has determined that the minimum criteria for monitoring and reporting regarding native planting projects are as detailed below.

A. All native planting areas shall be monitored annually for a three-year period to ensure successful establishment of the plantings. The primary objective of the monitoring program is to track the success of the planted species over the 3-year period of regularly scheduled monitoring sessions. The monitoring documents changes in plant community composition and reveals the need for management changes to improve floristic quality. Specific goals of the monitoring are to determine the vegetative species present, the percent cover by vegetation, and to identify hydrological and erosion problems.
B. Perform at least one (1) qualitative monitoring visit within the native planting areas. Monitoring may occur anytime during the months of May-September. Meander survey methods (Figure 5-3) will be utilized to gather data required for reporting to the project stakeholders. Data gathered during monitoring activities shall include:
    1. Total, native, and non-native/weedy vegetative coverage throughout each planting zone.
    2. Plant inventories for the entire site and each planting zone if required. This data will be used to compile mean coefficients of conservatism values, Floristic Quality Indices (FQI), and mean wetness values.
    3. Tree and shrub survival rates.
    4. Representative site photographs.
C. Perform at least one (1) quantitative monitoring visit within the native planting areas. Monitoring may occur anytime during the months of May-September. Permanent straight line transect and quadrat survey methods (Figures 5-4 and 5-5) will be utilized to gather data required for determining final success criteria. Data gathered during monitoring activities shall include:
    1. Vegetative data from a series of quadrats located along permanent straight line transects resulting in 30 or more quadrats per each planting zone or a maximum of 20% of the area planting zone. Data collected shall be used

Figure 5-3: Meander survey example

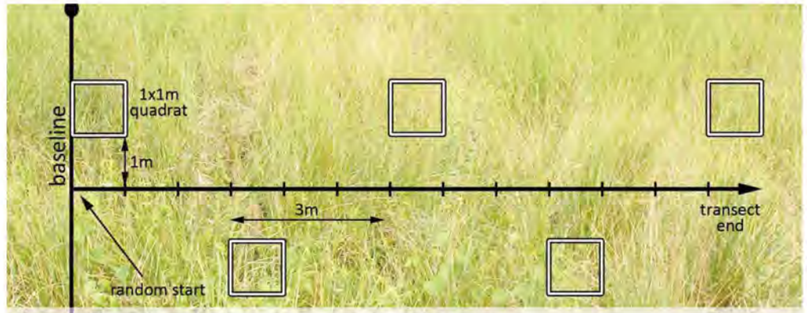


Figure 5-4: Diagram of straight line transect sampling

Figure 5-5: Individual performing a straight line transect study

to validate or dispute visual assessments of vegetative coverage and assessments of vegetative dominance, coverage and distribution. This level of sampling and replication should be enough to overcome any uncontrollable environmental variation.

D. One (1) annual monitoring report shall be submitted in duplicate to the Village Ecologist by February 15th following each monitoring year. The annual monitoring report shall contain the following information:

1. Introduction
    a. Site history leading up to the current project, including construction and management to date.
    b. Site description, including a street address (if applicable), County, Section, Township, and Range.
    c. A site location map.
    d. Permit numbers and department/county of issue (if applicable).
2. Vegetation Monitoring
    a. Methods
        i. Summarize the methods used for vegetation monitoring, including the survey dates.
    b. Results
        i. Summarize the results of the vegetation monitoring.
    c. Provide Data Summaries, including:
        i. Floristic Quality Assessment Data for the Baseline Meander Survey (if available)
        ii. Floristic Quality Assessment Data for the Meander & Transect Survey:
            - Native Mean Coefficient of Conservatism Value (Native Mean C Value)
            - Native Floristic Quality Index (Native FQI)
            - Relative Importance Value of all plant species (RIVn)
            - A comparison table that lists previous years' data (if available) with current year's data as both compare with performance criteria.
            - Live Plant Material:
                - Report on the condition of any native woody live plant material
3. Discussion
    a. Discuss the work performed as part of ongoing stewardship during the previous calendar year (if applicable).
    b. Compare the current year's data with data from the previous years (if available).
    c. Compare current year's results against the performance criteria.
    d. Describe any deficiencies in the stewardship activities to date that are hindering the site's ability to meet the performance criteria and propose detailed corrective actions.
    e. Discuss in detail the stewardship activities that are recommended in the upcoming year.
    f. Conclusion
4. Exhibits
    a. Copies of any applicable permits.
    b. Original site plan, including topography, planting zones, tree locations, etc.
    c. Adapted site plan showing areas of deficiency, areas of erosion, etc.
    d. Original species lists installed
    e. Floristic Quality Assessment data tables

5.03 Remediation & Formal Acceptance

If native planting areas fail to meet the terms of the performance criteria, the Applicant should develop and submit a remedial action plan that takes into consideration the site goals and specific deficiencies. The contractor will implement the approved remedial action plan and submit a report that describes the remedial action taken. Final acceptance is not granted until all planting areas meet performance criteria or meet the stated intent of the project to the satisfaction of the Village Ecologist. Even after formal acceptance, natural areas need to be maintained in perpetuity.

NATIVE PLANTING GUIDELINE APPENDICES

A: Native Seed and Plant Mixes

B: Contact Information for Local Professional Natural Areas Contractors

C: Contact Information for Regional Native Plant & Seed Suppliers

D: Invasive Species List

E: Submittal Checklist

F: Examples of Installations

G: Hydrograph Information

H: References & Additional Information

I: Glossary

VILLAGE OF LEMONT

NATIVE SEED AND PLANT MIXES

Buffalo Grass Lawn Seed Mix (Dry-Mesic Soils)

MIX STATISTICS	
Average Mix Height (ft)	0.5
Median Mix Height (ft)	0.5
Species Heights (# of Occurrences in Mix)	0.5' (1)
Number of Native Species in Mix	1
Native FQI	0.0
Native Mean C Value	0.0
Native Mean W Value	5.0
National Wetland Category	UPL
Lbs/Acre of Native Seed	100.0
Seeds per Square Foot	132.2
Percent of Mix (by Seed Count) Requiring Stratification	0.0%

Mix Description: An alternative to traditional high-maintenance turf grass, such as Kentucky Bluegrass, Fescue, and Rye. While not thought to be locally native to the Chicago Region (it is known to be native to Southern Illinois and in the Western U.S.), Bowie is a cultivar that has the ability to survive colder northern climates. Unlike traditional high-maintenance turf grass, Buffalo Grass is a slow grower with a maximum hight of 4-8" requiring little or no mowing and less than 1" of water per week. It prefers full sun, however it will survive in partial or dappled shade conditions. Buffalo Grass is a warm-season grass, which means it will go dormant (turns golden brown) in the fall and takes approximately a month longer to green-up in the spring when compaired to traditional turf grass. Seeding of this mix should only occur in late spring - early summer when the soil temperatures reach 60-70° (typically late May - early July).

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION	TOP SOW
BOUDAB	*Bouteloua dactyloides 'BOWIE'*	Bowie Buffalo Grass	0	5	UPL	3"-8"	0.5	N/A								3,600	1,600.00	100.00	100.00%	100.00%	N/A	
																Grass/Sedge Subtotals		**100.000**	**100.00%**	**100.00%**		
																Mix TOTALS		**100.000**	**100.00%**	**100.00%**		

Coefficients of Conservatism: Swink, F. and G. Wilhelm. 1994. Plants of the Chicago Region. 4th Edition. Indianapolis: Indiana Academy of Science.
Wetness Values: Midwest region values from Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

Transitional Buffer Seed Mix (Dry-Mesic Soils)

MIX STATISTICS	
Average Mix Height (ft)	1.9
Median Mix Height (ft)	1.3
Species Heights (# of Occurrences in Mix)	0.5' (1), 2' (1)
Number of Native Species in Mix	2
Native FQI	2.8
Native Mean C Value	4.0
Native Mean W Value	5.0
National Wetland Category	UPL
Lbs/Acre of Native Seed	65.0
Seeds per Square Foot	138.8
Percent of Mix (by Seed Count) Requiring Stratification	0.0%

Mix Description: Designed as a short-grass native planting that can be installed between low, flat areas (turf grass areas, sidewalks, etc.) and the taller, more diverse prairie areas. Providing this buffer achieves multiple things; 1.) Since some taller prairie species can "flop" and/or look "leggy" at the base, this short-grass buffer provides space so that taller plants will not flop onto the lawn or pavement, and it will also provide a visual screen to the lower, unattractive portion of the prairie; 2.) This buffer is easy to maintain with broadleaf herbicides, which gives a neat, "cared for" appearance that establishes a defined edge to the prairie; and 3.) Provides an all-grass buffer between lawn and prairie that will protect the broadleaf wildflowers in the prairie from annual "weed'n'feed" applications (which contain a broadleaf herbicide) to the lawn. The grasses in this mix are warm-season grasses, which means they will go dormant (turn golden brown) in the fall. Seeding of this mix should only occur in spring (typically before June 15th).

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION	TOP SOW
BOUCUR	*Bouteloua curtipendula*	Side-oats Grama	8	5	UPL	1.5-2.5'	2	N/A								6,000	160.00	10.00	38.36%	32.55%	N/A	
BOUDAB	*Bouteloua dactyloides 'BOWIE'*	Bowie Buffalo Grass	0	5	UPL	3"-8"	0.5	N/A								3,600	80.00	5.00	18.18%	3.77%	N/A	
CXYULP	*Carex vulpinoidea*	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A								100,000	40.00	2.50	9.09%	52.38%	CM-60	
SCHSCO	*Schizachyrium scoparium*	Little Bluestem	5	3	FACU	2-3'	3	N/A								15,000	160.00	10.00	36.36%	11.38%	N/A	
																Grass/Sedge Subtotals		**27.500**	**100.00%**	**100.00%**		
																Mix TOTALS		**27.500**	**100.00%**	**100.00%**		

Coefficients of Conservatism: Swink, F. and G. Wilhelm. 1994. Plants of the Chicago Region. 4th Edition. Indianapolis: Indiana Academy of Science.
Wetness Values: Midwest region values from Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

Transitional Buffer Seed Mix (Wet-Mesic Soils)

MIX STATISTICS	
Average Mix Height (ft)	2.8
Median Mix Height (ft)	2.5
Species Heights (# of Occurrences in Mix)	0.5' (1), 2' (1), 3' (2)
Number of Native Species in Mix	4
Native FQI	8.0
Native Mean C Value	3.8
Native Mean W Value	2.5
National Wetland Category	UPL
Lbs/Acre of Native Seed	27.5
Seeds per Square Foot	175.6
Percent of Mix (by Seed Count) Requiring Stratification	52.3%

Mix Description: Designed as a short-grass native planting that can be installed between low, flat areas (turf grass areas, sidewalks, etc.) and the taller, more diverse prairie areas. Providing this buffer achieves multiple goals; 1.) Since some taller prairie species can "flop" and/or look "leggy" at the base, this short-graminoid buffer provides space so that taller plants will not flop onto the lawn or pavement, and it will also provide a visual screen to the lower, less attractive portion of the prairie; 2.) This buffer is easy to maintain with standard broadleaf herbicides, which gives a neat, "cared for" appearance that establishes a defined edge to the prairie; and 3.) Provides an all-graminoid buffer between lawn and prairie that will protect the broadleaf wildflowers in the prairie from annual "weed'n'feed" applications (which contain a broadleaf herbicide) to the lawn. This mix is dominated by Brown Fox Sedge, which means the preferred seeding timeframe of this mix is in fall to allow for proper stratification (typically after October 1st and before December 31st).

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION	TOP SOW
BOUCUR	*Bouteloua curtipendula*	Side-oats Grama	8	5	UPL	1.5-2.5'	2	N/A								6,000	160.00	10.00	36.36%	32.55%	N/A	
BOUDAB	*Bouteloua dactyloides 'BOWIE'*	Bowie Buffalo Grass	0	5	UPL	3"-8"	0.5	N/A								3,600	80.00	5.00	18.18%	3.77%	N/A	
CXYULP	*Carex vulpinoidea*	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A								100,000	40.00	2.50	9.09%	52.38%	CM-60	
SCHSCO	*Schizachyrium scoparium*	Little Bluestem	5	3	FACU	2-3'	3	N/A								15,000	160.00	10.00	36.36%	11.38%	N/A	
																Grass/Sedge Subtotals		**27.500**	**100.00%**	**100.00%**		
																Mix TOTALS		**27.500**	**100.00%**	**100.00%**		

Coefficients of Conservatism: Swink, F. and G. Wilhelm. 1994. Plants of the Chicago Region. 4th Edition. Indianapolis: Indiana Academy of Science.
Wetness Values: Midwest region values from Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

Germination Codes

N/A: Seed should germinate upon sowing in a warm location; no pretreatment necessary	L: Plant fresh seed or keep moist
CM-# of stratifying days: Seeds germinate after a period of cold, moist stratification	M: Best planted outdoors in the fall
WM-# of stratifying days: Seeds germinate after a period of warm, moist stratification	O: Seed needs nicking
B: Hot water treatment	S: Fern spore sowing
G: Seeds germinate most successfully in cool soil	?: Not sure
H: Seeds need scarification	
I: Legume, Rhizobium inoculum	
J: Remove the hulls from these legume seeds	
K: Hemiparasitic species which needs a host plant	

Low Profile Prairie Seed Mix (Dry-Mesic Soils)

MIX STATISTICS	
Base Mix Without Supplemental Plugs	
Average Mix Height (ft)	2.6
Median Mix Height (ft)	3.0
Species Heights (# of Occurrences in Mix)	1.5' (1), 2' (15), 3' (12), 4' (1), 5' (2)
Number of Native Species in Mix	41
Native FQI	35.7
Native Mean C Value	5.7
Native Mean W Value	2.4
National Wetland Category	FACU
Lbs/Acre of Native Seed	25.8
Seeds per Square Foot	123.8
Percent of Mix (by Seed Count) Requiring Stratification	51.6%

Mix Description: Designed for sunny areas that remain mesic-dry for most of the growing season. This mix is composed of a diverse collection of shorter-profile prairie grass and wildflower species, and is ideal for areas where taller vegetation is not appropriate. This mix averages 2.6' in height by seed count with nearly 50% of the mix is composed of wildflowers that will provide an array of blooms from April through October. When installed and maintained correctly this mix will typically begin flowering in it's second growing season, starting with the yellow blooms of annual Partridge Pea and biennial Black-Eyed Susan, with additional more colorful permanent species appearing in years 3-5. This mix can be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your prairie.

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION	TOP SOW
BOUCUR	*Bouteloua curtipendula*	Side-oats Grama	8	5	UPL	1.5-2.5'	2	N/A								6,000	160.00	10.00	38.82%	17.79%	N/A	
CXBICK	*Carex bicknellii*	Copper-shouldered Oval Sedge	10	3	FACU	1.5-2.5'	2	N/A								17,000	4.00	0.25	0.97%	1.26%	CM-60	
CXBREV	*Carex brevior*	Plains Oval Sedge	4	0	FAC	1-3'	2	N/A								29,000	2.00	0.13	0.49%	1.08%	CM-60	
CXMOLE	*Carex molesta*	Field Oval Sedge	2	0	FAC	1-2.5'	2	N/A								25,000	2.00	0.13	0.49%	0.93%	CM-60	
ELYCAN	*Elymus canadensis*	Canada Wild Rye	4	3	FACU	3-5'	5	N/A								5,200	32.00	2.00	7.76%	3.08%	N/A	
JUNDUD	*Juncus dudleyi*	Dudley's Rush	4	-3	FACW	1-2.5'	2	N/A								3,200,000	0.125	0.01	0.03%	7.41%	CM-60	
PANVIR	*Panicum virgatum*	Switch Grass	5	0	FAC	3-6'	4	N/A								14,000	8.00	0.50	1.94%	2.08%	N/A	
SCHSCO	*Schizachyrium scoparium*	Little Bluestem	5	3	FACU	2-3'	3	N/A								15,000	60.00	3.75	14.56%	16.68%	N/A	
																		Grass/Sedge Subtotals	**16.758**	**65.06%**	**50.32%**	

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION	TOP SOW
ALLCER	*Allium cernuum*	Nodding Onion	7	3	FACU	1-2'	1.5	Purple								7,600	3.00	0.19	0.73%	0.42%	CM-60	
AMOCAN	*Amorpha canescens*	Lead Plant	9	5	UPL	1-3.5'	3	Purple								16,000	1.00	0.06	0.24%	0.30%	CM-10, H, I, J	
ASCTUB	*Asclepias tuberosa*	Butterfly Weed	7	5	UPL	1-2.5'	2	Orange								4,300	16.00	1.00	3.88%	1.28%	CM-30	
ASTCAN	*Astragalus canadensis*	Canada Milk Vetch	10	0	FAC	2-4'	3	Cream								17,000	0.75	0.05	0.18%	0.24%	CM-10, H, I	
BAPALB	*Baptisia alba*	White Wild Indigo	8	3	FACU	3-6'	4	White								1,700	2.50	0.16	0.61%	0.08%	CM-10, H, I	
CHAFAS	*Chamaecrista fasciculata*	Partridge Pea	5	3	FACU	6"-2'	2	Yellow								2,700	16.00	1.00	3.88%	0.80%	CM-10, H, I	
CORLAN	*Coreopsis lanceolata*	Sand Coreopsis	5	3	FACU	1.5-3'	2	Yellow								20,000	6.00	0.38	1.46%	2.22%	CM-30	
DALPUR	*Dalea purpurea*	Purple Prairie Clover	9	5	UPL	1-3'	2	Purple								18,000	8.00	0.50	1.94%	2.67%	I, J	
DESILL	*Desmanthus illinoensis*	Illinois Bundle Flower	3	3	FACU	2-4'	4	Yellow								4,200	3.00	0.19	0.73%	0.23%	H, I	
DRYARG	*Drymocallis arguta*	Prairie Cinquefoil	9	3	FACU	1-3'	2	White								230,000	0.25	0.02	0.06%	1.07%	CM-60, G	
ECHPAL	*Echinacea pallida*	Pale Purple Coneflower	8	5	UPL	2-3'	3	Purple								5,200	16.00	1.00	3.88%	1.54%	CM-90 or M	
ECHPUR	*Echinacea purpurea*	Purple Coneflower	3	5	UPL	2-5'	4	Purple								6,600	4.00	0.25	0.97%	0.49%	N/A	
ERYYUC	*Eryngium yuccifolium*	Rattlesnake Master	9	0	FAC	2-5'	4	White								7,500	3.00	0.19	0.73%	0.42%	CM-60	
EUPCOR	*Euphorbia corollata*	Flowering Spurge	2	5	UPL	1-3'	3	White								8,000	2.00	0.13	0.49%	0.30%	CM-30	
HELHEL	*Heliopsis helianthoides*	Early Sunflower	5	3	FACU	3-5'	5	Yellow								6,300	8.00	0.50	1.94%	0.93%	CM-30	
LESCAP	*Lespedeza capitata*	Round-headed Bush Clover	4	3	FACU	2-5'	4	Green								8,000	4.00	0.25	0.97%	0.59%	CM-10, H, I, J	
LIAASP	*Liatris aspera*	Button Blazing Star	6	5	UPL	2-5'	3	Purple								16,000	3.00	0.19	0.73%	0.89%	CM-60	
LIAPYC	*Liatris pycnostachya*	Prairie Blazing Star	8	0	FAC	2-4'	4	Purple								11,000	4.00	0.25	0.97%	0.82%	CM-60	
MONFIS	*Monarda fistulosa*	Wild Bergamot	4	3	FACU	2.5-4'	4	Purple								70,000	1.00	0.06	0.24%	1.30%	N/A	
PARINT	*Parthenium integrifolium*	Wild Quinine	8	5	UPL	2-3.5'	3	White								7,000	8.00	0.50	1.94%	1.04%	CM-60	
PENDIG	*Penstemon digitalis*	Foxglove Beardtongue	4	0	FAC	2-3'	3	White								130,000	2.00	0.13	0.49%	4.82%	CM-30, G	
PYCTEN	*Pycnanthemum tenuifolium*	Slender Mountain Mint	7	0	FAC	1-3'	2	White								378,000	0.25	0.02	0.06%	1.75%	N/A	
RATPIN	*Ratibida pinnata*	Yellow Coneflower	4	5	UPL	2-4'	4	Yellow								30,000	2.00	0.13	0.49%	1.11%	CM-30	
RUDFUL	*Rudbeckia fulgida*	Orange Coneflower	8	5	OBL	2-4'	3	Orange								31,000	2.00	0.13	0.49%	1.15%	CM-60	
RUDHIR	*Rudbeckia hirta*	Black-eyed Susan	1	3	FACU	2-3'	2	Yellow								92,000	8.00	0.50	1.94%	13.64%	CM-30	
SOLJUN	*Solidago juncea*	Early Goldenrod	5	5	UPL	1-3'	3	Yellow								290,000	0.50	0.03	0.12%	2.69%	CM-60	
SOLRIG	*Solidago rigida*	Stiff Goldenrod	4	3	FACU	2-5'	4	Yellow								41,000	0.50	0.03	0.12%	0.38%	CM-60	
SYMERI	*Symphyotrichum ericoides*	Heath Aster	5	3	FACU	1-3'	2	White								200,000	0.50	0.03	0.12%	1.85%	N/A	
SYMLAE	*Symphyotrichum laeve*	Smooth Blue Aster	9	3	FACU	1.5-3'	3	Blue								55,000	0.50	0.03	0.12%	0.51%	N/A	
SYMNOV	*Symphyotrichum novae-angliae*	New England Aster	4	-3	FACW	3-5'	4	Purple								66,000	0.25	0.02	0.06%	0.31%	CM-60	
TRAOHI	*Tradescantia ohiensis*	Ohio Spiderwort	2	3	FACU	2-4'	3	Blue								8,000	8.00	0.50	1.94%	1.19%	CM-320 or M, G	
VERSTR	*Verbena stricta*	Hoary Vervain	4	5	UPL	1-3'	2	Blue								28,000	2.00	0.13	0.49%	1.04%	CM-60	
ZIZAUR	*Zizia aurea*	Golden Alexanders	7	0	FAC	1-2.5'	2	Yellow								11,000	8.00	0.50	1.94%	1.63%	CM-60 or M, G	
																		Wildflower Subtotals	**9.000**	**34.94%**	**49.68%**	
																		Mix TOTALS	**25.758**	**100.00%**	**100.00%**	

Plug Species to Diversify Seed Mix - READILY AVAILABLE IN THE NURSERY TRADE

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	SIZE	PLANTS/ FLAT	FLATS/ ACRE	PLANTS/ ACRE	PLANTS/ SF	% OF TOTAL PLANTS	NOTE*
ANECAN	*Anemone canadensis*	Canada Anemone	4	3	FACW	1-2'	1	White								2" plug	38	5.0	190.0	0.00	8.7%	1, 3
ASCVER	*Asclepias verticillata*	Whorled Milkweed	1	3	FACU	6"-2'	2	White								2" plug	50	3.0	150.0	0.00	6.8%	2, 3
BAPBRA	*Baptisia bracteata*	Cream Wild Indigo	10	5	UPL	1-3'	2	Cream								2" plug	38	2.0	76.0	0.00	3.5%	1, 2, 3
CEAAME	*Ceanothus americanus*	New Jersey Tea	6	5	UPL	1-3'	3	White								2" plug	38	3.0	114.0	0.00	5.2%	1, 3
DODMEA	*Dodecatheon meadia*	Midland Shooting Star	6	3	FACU	1-2'	1	Pink								2" plug	32	10.0	320.0	0.01	14.6%	1, 2
GEUTRI	*Geum triflorum*	Prairie Smoke	10	3	FACU	4"-10"	0.7	Red								2" plug	50	2.0	100.0	0.00	4.6%	1, 2
HEURIC	*Heuchera richardsonii*	Prairie Alumroot	8	3	FACU	2-4'	2	Green								2" plug	50	2.0	100.0	0.00	4.6%	1, 2
PENPAL	*Penstemon pallidus*	Pale Beardtongue	6	5	UPL	1-2.5'	1.5	Cream								2" plug	50	3.0	150.0	0.00	6.8%	5
ROSBLA	*Rosa blanda*	Early Wild Rose	5	3	FACU	3-5'	4	Pink								2" plug	38	1.0	38.0	0.00	1.7%	1, 3
ROSCAR	*Rosa carolina*	Pasture Rose	5	3	FACU	1-3'	2	Pink								2" plug	38	2.0	76.0	0.00	3.5%	
RUEHUM	*Ruellia humilis*	Wild Petunia	7	3	FACU	6-12"	1	Purple								2" plug	50	3.0	150.0	0.00	6.8%	3
SPOHET	*Sporobolus heterolepis*	Prairie Dropseed	10	3	FACU	1-3'	2	N/A								2" plug	50	10.0	500.0	0.01	22.8%	1, 2
VERVIR	*Veronicastrum virginicum*	Culver's Root	7	0	FAC	3-6'	5	White								2" plug	50	3.0	150.0	0.00	6.8%	1
VIOPED	*Viola pedata var. linariifolia*	Bird's Foot Violet	9	3	FACU	3"-8"	0.5	Purple								2" plug	38	2.0	76.0	0.00	3.5%	1, 5
																		51.0	2,190.00	0.05	100.00%	

Plug Species to Diversify Seed Mix - TYPICALLY AVAILABLE THROUGH CONTRACT GROW ONLY

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	SIZE	PLANTS/ FLAT	FLATS/ ACRE	PLANTS/ ACRE	PLANTS/ SF	% OF TOTAL PLANTS	NOTE*
GENALB	*Gentiana alba*	Cream Gentian	9	3	FACU	1-3'	2	Cream								2" plug	32	2.0	64.00	0.00	10.6%	1, 4
GENAND	*Gentiana andrewsii*	Bottle Gentian	8	-3	FACW	1-3'	2	Blue								2" plug	38	3.0	114.00	0.00	18.9%	1, 2, 4
GENPUB	*Gentiana puberulenta*	Downy Gentian	10	5	UPL	9"-2'	1	Blue								2" plug	32	2.0	64.00	0.00	10.6%	1, 2, 4, 5
PEDCAN	*Pedicularis canadensis*	Wood Betony	9	3	FACU	6"-12"	1	Yellow								2" plug	38	2.0	76.00	0.00	12.6%	1, 5
PHLPIL	*Phlox pilosa*	Prairie Phlox	7	3	FACU	1-3'	2	Pink								2" plug	38	5.0	190.00	0.00	31.5%	1, 2, 5
SISALB	*Sisyrinchium albidum*	White Blue-eyed Grass	7	3	FACU	6"-12"	0.5	White								2" plug	32	3.0	96.00	0.00	15.9%	2
																		17.0	604.00	0.01	100.00%	

*Following are the common reasons for not including these recommended plug species within the seed mix.
1) Does not germinate well from seed in the field
2) Seed is very expensive
3) Low number of seeds per ounce
4) Requires specialized microclimate
5) Seed is not commercially available or is only available in small quantities

Dry-Bottom Detention Basin Seed Mix (Mesic-Wet Soils at the Bottom of Basins or Swales)

MIX STATISTICS

Base Mix Without Supplemental Plugs	
Average Mix Height (ft)	3.4
Median Mix Height (ft)	4.0
Species Heights (# of Occurrences in Mix)	1.5' (1), 2' (10), 3' (8), **4' (13)**, 5' (8), 6' (3), 7' (2), 8' (1)
Number of Native Species in Mix	46
Native FQI	32.6
Native Mean C Value	4.8
Native Mean W Value	1.0
National Wetland Category	FAC+
Lbs/Acre of Native Seed	30.0
Seeds per Square Foot	330.8
Percent of Mix (by Seed Count) Requiring Stratification	59.0%

Mix Description: Designed for sunny areas that flood periodically for short periods of time, ranging from 24-48 hours, but remain mesic-dry for most of the growing season. It is composed of species that tolerate fluctuating water levels & poor water quality, and is ideal for planting in the bottom of dry-bottom detention basins, within the "Bounce Zone" on detention basin slopes, dry-bottom bioswales, large rain gardens, and within open floodplains. This is a medium height prairie with an average height of 3.4' by seed count and about 23% of seeds typically averaging 5.0' high or more. While this mix does provide flowering species from April-October, it is designed to be a bit graminoid heavy (particularly long-term) with nearly 66% of seeds being grass and sedge species. ecology designed the mix in this fashion to ensure excellent erosion control when used in stromwater applications. This mix can be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your naturalized basin.

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION
ANDGER	*Andropogon gerardii*	Big Bluestem	5	0	FAC	6-8'	7	N/A	10,000	64.00	4.00	13.33%	4.44%	N/A
CXBEBB	*Carex bebbii*	Bebb's Oval Sedge	6	-5	OBL	1-3'	2	N/A	34,000	2.00	0.13	0.42%	0.47%	CM-60
CXBREV	*Carex brevior*	Plains Oval Sedge	4	0	FAC	1-3'	2	N/A	29,000	4.00	0.25	0.83%	0.81%	CM-60
CXCRIS	*Carex cristatella*	Crested Oval Sedge	4	-3	FACW	2-4'	3	N/A	58,000	1.00	0.06	0.21%	0.40%	CM-60
CXHYST	*Carex hystericina*	Porcupine Sedge	5	-5	OBL	1-2.5'	2	N/A	30,000	2.00	0.13	0.42%	0.42%	CM-60
CXMOLE	*Carex molesta*	Field Oval Sedge	2	0	FAC	1-2.5'	2	N/A	25,000	3.00	0.19	0.63%	0.52%	CM-60
CXSCOP	*Carex scoparia*	Lance-fruited Oval Sedge	7	-3	FACW	1-3'	2	N/A	84,000	1.00	0.06	0.21%	0.58%	CM-60
CXVULP	*Carex vulpinoidea*	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A	100,000	8.00	0.50	1.67%	5.55%	CM-60
ELEPAL	*Eleocharis palustris*	Great Spike Rush	2	-5	OBL	1-3.5'	2	N/A	51,000	6.00	0.38	1.25%	2.12%	CM-60
ELYCAN	*Elymus canadensis*	Canada Wild Rye	4	3	FACU	3-5'	5	N/A	5,200	32.00	2.00	6.67%	1.15%	N/A
ELYVIR	*Elymus virginicus*	Virginia Wild Rye	4	-3	FACW	2.5-4'	4	N/A	4,200	48.00	3.00	10.00%	1.40%	N/A
JUNDUD	*Juncus dudleyi*	Dudley's Rush	4	-3	FACW	1-2.5'	2	N/A	3,200,000	1.00	0.06	0.21%	22.21%	CM-60
PANVIR	*Panicum virgatum*	Switch Grass	5	0	FAC	3-6'	4	N/A	14,000	80.00	5.00	16.67%	7.77%	N/A
SCHSCO	*Schizachyrium scoparium*	Little Bluestem	5	3	FACU	2-3'	3	N/A	15,000	64.00	4.00	13.33%	6.66%	N/A
SCIATR	*Scirpus atrovirens*	Dark-green Bulrush	4	-5	OBL	2-6'	5	N/A	460,000	1.00	0.06	0.21%	3.19%	CM-60 or M
SCICYP	*Scirpus cyperinus*	Wool Grass	6	-5	OBL	3-5'	5	N/A	1,700,000	0.50	0.03	0.10%	5.90%	CM-60 or M
SORNUT	*Sorghastrum nutans*	Indian Grass	5	3	FACU	3-7'	6	N/A	12,000	16.00	1.00	3.33%	1.33%	N/A
									Grass/Sedge Subtotals		20.844	69.48%	64.94%	

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION
ALLCER	*Allium cernuum*	Nodding Onion	7	3	FACU	1-2'	1.5	Purple	7,600	4.00	0.25	0.83%	0.21%	CM-60
ASCINC	*Asclepias incarnata*	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink	4,800	24.00	1.50	5.00%	0.80%	CM-30
CHAFAS	*Chamaecrista fasciculata*	Partridge Pea	5	3	FACU	6"-2'	2	Yellow	2,700	16.00	1.00	3.33%	0.30%	CM-10, H, I
CORTRI	*Coreopsis tripteris*	Tall Coreopsis	5	0	FAC	3-8'	7	Yellow	14,000	6.00	0.38	1.25%	0.58%	CM-60
DESCAA	*Desmodium canadense*	Showy Tick Trefoil	4	3	FACU	3-6'	4	Purple	5,500	4.00	0.25	0.83%	0.15%	J, I
ECHPUR	*Echinacea purpurea*	Purple Coneflower	3	5	UPL	2-5'	4	Purple	6,600	8.00	0.50	1.67%	0.37%	N/A
ERYYUC	*Eryngium yuccifolium*	Rattlesnake Master	9	0	FAC	2-5'	4	White	7,500	12.00	0.75	2.50%	0.62%	CM-60
EUPPER	*Eupatorium perfoliatum*	Boneset	4	-5	OBL	3-4'	4	White	160,000	0.50	0.03	0.10%	0.56%	CM-30
EUTGRA	*Euthamia graminifolia*	Grass-leaved Goldenrod	4	-3	FACW	2-4'	3	Yellow	350,000	1.00	0.06	0.21%	2.43%	CM-60
EUTMAC	*Eutrochium maculatum*	Spotted Joe Pye Weed	4	-5	OBL	3-6'	5	Pink	95,000	2.00	0.13	0.42%	1.32%	CM-30
HELAUT	*Helenium autumnale*	Sneezeweed	5	-3	FACW	2-5'	4	Yellow	130,000	3.00	0.19	0.63%	2.71%	N/A
KUHEUP	*Kuhnia eupatorioides*	False Boneset	6	5	UPL	1-3.5'	3	Cream	32,000	4.00	0.25	0.83%	0.89%	N/A
LIAPYC	*Liatris pycnostachya*	Prairie Blazing Star	8	0	FAC	2-4'	4	Purple	11,000	2.00	0.13	0.42%	0.15%	CM-60
LIASPI	*Liatris spicata*	Marsh Blazing Star	6	0	FAC	2-5'	5	Purple	11,000	2.00	0.13	0.42%	0.15%	CM-60
MONFIS	*Monarda fistulosa*	Wild Bergamot	4	3	FACU	2.5-4'	4	Purple	70,000	4.00	0.25	0.83%	1.94%	N/A
PENDIG	*Penstemon digitalis*	Foxglove Beardtongue	4	0	FAC	2-3'	3	White	130,000	4.00	0.25	0.83%	3.61%	CM-30, G
PHYVIR	*Physostegia virginiana*	Obedient Plant	6	-3	FACW	3-4'	4	Pink	11,000	2.00	0.13	0.42%	0.15%	CM-60
PYCVIR	*Pycnanthemum virginianum*	Virginia Mountain Mint	5	-3	FACW	1-4'	3	White	220,000	2.00	0.13	0.42%	3.05%	N/A
RUDHIR	*Rudbeckia hirta*	Black-eyed Susan	1	3	FACU	2-3'	2	Yellow	92,000	8.00	0.50	1.67%	5.11%	CM-30
RUDSUB	*Rudbeckia subtomentosa*	Sweet Black-eyed Susan	9	3	FACU	3-6'	5	Yellow	43,000	1.00	0.06	0.21%	0.30%	CM-30
RUDTRI	*Rudbeckia triloba*	Brown-eyed Susan	3	3	FACU	2-6'	5	Yellow	34,000	3.00	0.19	0.63%	0.71%	CM-30
SILPER	*Silphium perfoliatum*	Cup Plant	5	-3	FACW	6-10'	8	Yellow	1,400	0.50	0.03	0.10%	0.00%	CM-60
SOLRID	*Solidago riddellii*	Riddell's Goldenrod	7	-5	OBL	2-4'	3	Yellow	93,000	2.00	0.13	0.42%	1.29%	CM-60
SOLRIG	*Solidago rigida*	Stiff Goldenrod	4	3	FACU	2-5'	4	Yellow	41,000	1.50	0.09	0.31%	0.43%	CM-60
SYMNOV	*Symphyotrichum novae-angliae*	New England Aster	4	-3	FACW	3-5'	4	Purple	66,000	6.00	0.38	1.25%	2.75%	CM-60
THADAS	*Thalictrum dasycarpum*	Purple Meadow Rue	5	-3	FACW	3-7'	6	Cream	11,000	4.00	0.25	0.83%	0.31%	CM-60, G
VERHAS	*Verbena hastata*	Blue Vervain	4	-3	FACW	2-6'	5	Blue	93,000	4.00	0.25	0.83%	2.58%	CM-30
VERFAS	*Vernonia fasciculata*	Common Ironweed	5	-3	FACW	3-6'	6	Purple	24,000	4.00	0.25	0.83%	0.67%	CM-60
ZIZAUR	*Zizia aurea*	Golden Alexanders	7	0	FAC	1-2.5'	2	Yellow	11,000	12.00	0.75	2.50%	0.92%	CM-60 or M, G
									Wildflower Subtotals		9.156	30.52%	35.06%	
									Mix TOTALS		30.000	100.00%	100.00%	

Plug Species to Diversify Seed Mix - READILY AVAILABLE IN THE NURSERY TRADE

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	SIZE	PLANTS/FLAT	FLATS/ACRE	PLANTS/ACRE	PLANTS/SF	% OF TOTAL PLANTS	NOTE*
CXGRAN	*Carex granularis*	Pale Sedge	4	-3	FACW	1-2'	2	N/A	2" plug	50	10.0	500.0	0.01	20.4%	
CXTRIB	*Carex tribuloides*	Awl-fruited Oval Sedge	3	-5	OBL	1.5-3'	3	N/A	2" plug	50	10.0	500.0	0.01	20.4%	
FILRUB	*Filipendula rubra*	Queen Of The Prairie	10	-5	OBL	3-6'	5	Pink	2" plug	50	10.0	500.0	0.01	20.4%	1, 2, 5
ROSSET	*Rosa setigera*	Wild Climbing Rose	7	3	FACU	4-12'	8		2" plug	38	2.0	76.0	0.00	3.1%	1, 2, 3, 5
RUDFUS	*Rudbeckia fulgida var. sullivantii*	Showy Black-eyed Susan	8	-5	OBL	1.5-3'	3	Yellow	2" plug	38	10.0	380.0	0.01	15.5%	5
VERVIR	*Veronicastrum virginicum*	Culver's Root	7	0	FAC	3-6'	5	White	2" plug	50	10.0	500.0	0.01	20.4%	1
											52.0	2,456.00	0.06	100.00%	

Plug Species to Diversify Seed Mix - TYPICALLY AVAILABLE THROUGH CONTRACT GROW ONLY

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	SIZE	PLANTS/FLAT	FLATS/ACRE	PLANTS/ACRE	PLANTS/SF	% OF TOTAL PLANTS	NOTE*
CXPELL	*Carex pellita*	Broad-leaved Woolly Sedge	4	-5	OBL	1-3'	2	N/A	2" plug	38	10.0	380.00	0.01	47.6%	
CXSART	*Carex sartwellii*	Running Marsh Sedge	6	-3	FACW	1-3'	3	N/A	2" plug	38	2.0	76.00	0.00	9.5%	
CXTRIC	*Carex trichocarpa*	Hairy-fruited Lake Sedge	7	-5	OBL	2.5-4'	4	N/A	2" plug	38	2.0	76.00	0.00	9.5%	
ELEACI	*Eleocharis acicularis*	Needle Spike Rush	2	-5	OBL	2"-8"	0.7	N/A	2" plug	38	2.0	76.00	0.00	9.5%	5
GALBOR	*Galium boreale*	Northern Bedstraw	7	0	FAC	6"-18"	1.5	White	2" plug	38	2.0	76.00	0.00	9.5%	
GENAND	*Gentiana andrewsii*	Bottle Gentian	8	-3	FACW	1-3'	2	Blue	2" plug	38	3.0	114.00	0.00	14.3%	1, 2, 4
											21.0	798.00	0.02	100.00%	

*Following are the common reasons for not including these recommended plug species within the seed mix:
1) Does not germinate well from seed in the field
2) Seed is very expensive
3) Low number of seeds per ounce
4) Requires specialized microclimate
5) Seed is not commercially available or is only available in small quantities

Coefficients of Conservatism: Swink, F. and G. Wilhelm. 1994. Plants of the Chicago Region. 4th Edition. Indianapolis: Indiana Academy of Science.
Wetness Values: Midwest region values from Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

Wetland Seed Mix (Saturated Soils)

MIX STATISTICS

Base Mix Without Supplemental Plugs	
Average Mix Height (ft)	3.4
Median Mix Height (ft)	3.0
Species Heights (# of Occurrences in Mix)	2' (6), **3' (13)**, 4' (8), 5' (7), 6' (2), 8' (1)
Number of Native Species in Mix	37
Native FQI	29.3
Native Mean C Value	4.8
Native Mean W Value	-4.5
National Wetland Category	FACW+
Lbs/Acre of Native Seed	9.7
Seeds per Square Foot	252.2
Percent of Mix (by Seed Count) Requiring Stratification	85.3%

Mix Description: Designed for consistently saturated soil that does not dry out or areas with shallow standing water (up to 2" of consistent water depth). In addition to the traditional wetland application, this mix is also ideal for use directly adjacent to the waterline of pond and stream shorelines where the soil remains saturated and the water level consistently fluctuates 1-2". Almost 60% of the seeds in this mix are sedges, rushes, and grasses, providing a variety of foliage texture and color in addition to the wildflowers which provide blooms from May through October. The wetland mix will result in a short-medium profile with an average height of 3.4' by seed count at maturity. This mix can be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your wetland.

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION
CALCAN	*Calamagrostis canadensis*	Blue Joint Grass	3	-5	OBL	2-5'	4	N/A	280,000	4.00	0.25	2.59%	10.20%	N/A
CXCOMO	*Carex comosa*	Bristly Sedge	5	-5	OBL	2-3.5'	2	N/A	30,000	3.00	0.19	1.94%	0.82%	CM-60
CXCRIS	*Carex cristatella*	Crested Oval Sedge	4	-3	FACW	2-4'	3	N/A	58,000	1.00	0.06	0.65%	0.53%	CM-60
CXHYST	*Carex hystericina*	Porcupine Sedge	5	-5	OBL	1-2.5'	2	N/A	30,000	4.00	0.25	2.59%	1.09%	CM-60
CXSTIP	*Carex stipata*	Common Fox Sedge	3	-5	OBL	1.5-3'	3	N/A	34,000	4.00	0.25	2.59%	1.24%	CM-60
CXSTRI	*Carex stricta*	Common Tussock Sedge	5	-5	OBL	2.5-4'	3	N/A	53,000	2.00	0.13	1.29%	0.96%	CM-60
CXVULP	*Carex vulpinoidea*	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A	100,000	16.00	1.00	10.36%	14.56%	CM-60
ELEPAL	*Eleocharis palustris*	Great Spike Rush	2	-5	OBL	1-3.5'	2	N/A	51,000	4.00	0.25	2.59%	1.86%	CM-60
GLYSTR	*Glyceria striata*	Fowl Manna Grass	4	-5	OBL	2-3.5'	3	N/A	90,000	1.00	0.06	0.65%	0.82%	N/A
JUNDUD	*Juncus dudleyi*	Dudley's Rush	4	-3	FACW	1-2.5'	2	N/A	3,200,000	0.125	0.01	0.08%	3.64%	CM-60
JUNEFF	*Juncus effusus*	Common Rush	7	-5	OBL	2-4'	3	N/A	1,000,000	1.00	0.06	0.65%	9.10%	CM-60
LEEORY	*Leersia oryzoides*	Rice Cut Grass	4	-5	OBL	2-4'	4	N/A	34,000	8.00	0.50	5.18%	2.48%	N/A
SCHPUP	*Schoenoplectus pungens var. pungens*	Chairmaker's Rush	5	-5	OBL	2-5'	5	N/A	12,000	2.00	0.13	1.29%	0.22%	CM-60
SCHTAB	*Schoenoplectus tabernaemontani*	Great Bulrush	5	-5	OBL	4-7'	6	N/A	31,000	2.00	0.13	1.29%	0.56%	CM-60
SCIATR	*Scirpus atrovirens*	Dark-green Bulrush	4	-5	OBL	2-6'	5	N/A	460,000	2.00	0.13	1.29%	8.37%	CM-60 or M
SCICYP	*Scirpus cyperinus*	Wool Grass	6	-5	OBL	3-5'	5	N/A	1,700,000	0.125	0.01	0.08%	1.93%	CM-60 or M
									Grass/Sedge Subtotals		3.391	35.11%	58.39%	

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX by Weight	% OF MIX by Seed Count	GERMINATION
ALISUB	*Alisma subcordatum*	Mud Plantain	4	-5	OBL	1-3'	3	White	60,000	4.00	0.25	2.59%	2.18%	CM-30
ASCINC	*Asclepias incarnata*	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink	4,800	24.00	1.50	15.53%	1.05%	CM-30
BIDCER	*Bidens cernua*	Nodding Bur Marigold	5	-5	OBL	1-3'	3	Yellow	21,000	4.00	0.25	2.59%	0.76%	CM-60
BOLAST	*Boltonia asteroides*	False Aster	9	-5	OBL	3-5'	4	White	160,000	0.75	0.05	0.49%	1.09%	CM-60
CHEGLA	*Chelone glabra*	Turtlehead	8	-5	OBL	3-6'	5	Cream	92,000	2.00	0.13	1.29%	1.67%	CM-120 or M
EUPPER	*Eupatorium perfoliatum*	Boneset	4	-5	OBL	3-4'	4	White	160,000	2.00	0.13	1.29%	2.91%	CM-30
EUTGRA	*Euthamia graminifolia*	Grass-leaved Goldenrod	4	-3	FACW	2-4'	3	Yellow	350,000	0.25	0.02	0.16%	0.80%	CM-60
EUTMAC	*Eutrochium maculatum*	Spotted Joe Pye Weed	4	-5	OBL	3-6'	5	Pink	95,000	4.00	0.25	2.59%	3.46%	CM-30
HELAUT	*Helenium autumnale*	Sneezeweed	5	-3	FACW	2-5'	4	Yellow	130,000	1.00	0.06	0.65%	1.18%	N/A
HIBLAE	*Hibiscus laevis*	Halberd-leaved Rose Mallow	6	-5	OBL	3-6'	5	Pink	2,800	16.00	1.00	10.36%	0.41%	CM-60
IRIVIS	*Iris virginica var. shrevei*	Southern Blue Flag	5	-5	OBL	1-3'	3	Purple	1,000	24.00	1.50	15.53%	0.22%	CM-120 or M
LOBSIP	*Lobelia siphilitica*	Great Blue Lobelia	6	-5	OBL	1-4'	3	Blue	500,000	1.00	0.06	0.65%	4.55%	CM-60
MIMRIN	*Mimulus ringens*	Monkey Flower	6	-5	OBL	1-3'	2	Purple	2,300,000	0.50	0.03	0.32%	10.47%	CM-60
PENSED	*Penthorum sedoides*	Ditch Stonecrop	5	-5	OBL	1-2'	2	Red	1,300,000	0.25	0.02	0.16%	2.96%	CM-60
PHYVIR	*Physostegia virginiana*	Obedient Plant	6	-3	FACW	3-4'	4	Pink	11,000	2.00	0.13	1.29%	0.20%	CM-60
SAGLAT	*Sagittaria latifolia*	Common Arrowhead	4	-5	OBL	1-3'	3	White	61,000	4.00	0.25	2.59%	2.22%	CM-60
SILPER	*Silphium perfoliatum*	Cup Plant	5	-3	FACW	6-10'	8	Yellow	1,400	0.50	0.03	0.32%	0.01%	CM-60
SOLRID	*Solidago riddellii*	Riddell's Goldenrod	7	-5	OBL	2-4'	3	Yellow	93,000	2.00	0.13	1.29%	1.69%	CM-60
SYMNOV	*Symphyotrichum novae-angliae*	New England Aster	4	-3	FACW	3-5'	4	Purple	66,000	2.00	0.13	1.29%	1.20%	CM-60
VERFAS	*Vernonia fasciculata*	Common Ironweed	5	-3	FACW	3-6'	6	Purple	24,000	4.00	0.25	2.59%	0.87%	CM-60
VERHAS	*Verbena hastata*	Blue Vervain	4	-3	FACW	2-6'	5	Blue	93,000	2.00	0.13	1.29%	1.69%	CM-30
									Wildflower Subtotals		6.266	64.89%	41.61%	
									Mix TOTALS		9.656	100.00%	100.00%	

Plug Species to Diversify Seed Mix - READILY AVAILABLE IN THE NURSERY TRADE

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	PLANTS/FLAT	FLATS/ACRE	PLANTS/ACRE	PLANTS/SF	% OF TOTAL PLANTS	NOTE*
CXPELL	*Carex pellita*	Broad-leaved Woolly Sedge	4	-5	OBL	1-3'	2	N/A	38	20.0	760.0	0.02	4.3%	
CXTRIB	*Carex tribuloides*	Awl-fruited Oval Sedge	3	-5	OBL	1.5-3'	3	N/A	50	20.0	1,000.0	0.02	5.6%	
DOEUMB	*Doellingeria umbellata*	Flat-topped Aster	9	-3	FACW	2-5'	5	Cream	50	20.0	1,000.0	0.02	5.6%	1, 2
ELEERY	*Eleocharis erythropoda*	Red-rooted Spike Rush	2	-5	OBL	1-2.5'	2	N/A	38	20.0	760.0	0.02	4.3%	5
FILRUB	*Filipendula rubra*	Queen Of The Prairie	10	-5	OBL	3-6'	5	Pink	50	20.0	1,000.0	0.02	5.6%	1, 2, 5
JUNTOR	*Juncus torreyi*	Torrey's Rush	4	-3	FACW	2-3'	2	N/A	50	20.0	1,000.0	0.02	5.6%	5
LIASPI	*Liatris spicata*	Marsh Blazing Star	6	0	FAC	2-5'	5	Purple	50	20.0	1,000.0	0.02	5.6%	1, 2
LOBCAR	*Lobelia cardinalis*	Cardinal Flower	7	-5	OBL	2-5'	3	Red	50	86.0	4,300.0	0.10	24.1%	1, 2, 4
LYCAME	*Lycopus americanus*	Water Horehound	5	-5	OBL	1-3'	2	White	38	86.0	3,268.0	0.08	18.3%	5
MENARV	*Mentha arvensis*	Wild Mint	5	-3	FACW	1-2'	2	White	50	20.0	1,000.0	0.02	5.6%	5
SPAEUR	*Sparganium eurycarpum*	Great Bur Reed	6	-5	OBL	2-6'	4	White	32	86.0	2,752.0	0.06	15.4%	1
										418.0	17,840.00	0.41	100.00%	

Plug Species to Diversify Seed Mix - TYPICALLY AVAILABLE THROUGH CONTRACT GROW ONLY

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT Min-Max	HEIGHT Typical	BLOOM COLOR	PLANTS/FLAT	FLATS/ACRE	PLANTS/ACRE	PLANTS/SF	% OF TOTAL PLANTS	NOTE*
CXINTE	*Carex interior*	Prairie Star Sedge	10	-5	OBL	1-3'	2	N/A	38	15.0	570.00	0.01	2.4%	
CXLACU	*Carex lacustris*	Common Lake Sedge	6	-5	OBL	2.5-4'	3	N/A	38	15.0	570.00	0.01	2.4%	
CXLEPT	*Carex leptalea*	Bristlystalked Sedge	10	-5	OBL	1-2'	2	N/A	38	15.0	570.00	0.01	2.4%	
CXLUPN	*Carex lupulina*	Common Hop Sedge	7	-5	OBL	1.5-3.5	3	N/A	38	15.0	570.00	0.01	2.4%	2, 3
CXSQUA	*Carex squarrosa*	Narrow-leaved Cattail Sedge	10	-5	OBL	1.5-2.5'	2	N/A	38	15.0	570.00	0.01	2.4%	
CXSTER	*Carex sterilis*	Fen Star Sedge	10	-5	OBL	6"-12"	1	N/A	38	15.0	570.00	0.01	2.4%	
CXTRIC	*Carex trichocarpa*	Hairy-fruited Lake Sedge	7	-5	OBL	2.5-4'	4	N/A	38	15.0	570.00	0.01	2.4%	
ELEACI	*Eleocharis acicularis*	Needle Spike Rush	2	-5	OBL	2"-8"	0.7	N/A	38	15.0	570.00	0.01	2.4%	5
GENAND	*Gentiana andrewsii*	Bottle Gentian	8	-3	FACW	1-3'	2	Blue	38	15.0	570.00	0.01	2.4%	1, 2, 4
LYTALA	*Lythrum alatum*	Winged Loosestrife	7	-5	OBL	1-3'	3	Purple	50	250.0	12,500.00	0.29	52.2%	
ONOSEN	*Onoclea sensibilis*	Sensitive Fern	8	-3	FACW	1-3'	2	Green	12	250.0	3,000.00	0.07	12.5%	5
PEDLAN	*Pedicularis lanceolata*	Marsh Betony	9	-5	OBL	1-3'	2.5	Yellow	38	15.0	570.00	0.01	2.4%	1, 2, 5
PELVIR	*Peltandra virginica*	Green Arrow Arum	10	-5	OBL	8"-2'	2	Green	32	86.0	2,752.00	0.06	11.5%	2, 3
										736.0	23,952.00	0.55	100.00%	

*Following are the common reasons for not including these recommended plug species within the seed mix:
1) Does not germinate well from seed in the field
2) Seed is very expentive
3) Low number of seeds per ounce
4) Requires specialized microclimate
5) Seed is not commercially available or is only available in small quantities

Emergent Seed Mix (2-6" Water Depth)

MIX STATISTICS

Base Mix Without Supplemental Plugs

Average Mix Height (ft)	3.3
Median Mix Height (ft)	3.0
Species Heights (# of Occurrences in Mix)	2' (7), 3' (9), 4' (4), 5' (6), 6' (2)
Number of Native Species in Mix	28
Native FQI	28.9
Native Mean C Value	5.5
Native Mean W Value	-5.0
National Wetland Category	OBL
Lbs/Acre of Native Seed	9.3
Seeds per Square Foot	343.5
Percent of Mix (by Seed Count) Requiring Stratification	95.0%

Mix Description: Designed to grow in shallow water 2" to 6" deep. It is ideal for shallow water wetlands and within the emergent zone of a pond or stream shoreline. Over 40% of the seeds in this mix are sedges, rushes, and grasses with the remaining wildflowers providing an array of blooms from May through October. This emergent mix will result in a medium-tall profile with an average height of 3.3' by seed count. To achieve appropriate seed-to-soil contact for germination this mix must be planted prior to establishing normal water levels, or the water body must be drained in order to expose the soil within the targeted seeding area prior to seeding. We recommend installing appropriate temporary erosion control blanket over areas seeded with this mix. This seed mix can be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your wetland.

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM	BLOOM TIME							SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical	COLOR	A	M	J	J	A	S	O				by Weight	by Seed Count		
CXCOMO	*Carex comosa*	Bristly Sedge	5	-5	OBL	2-3.5'	2	N/A								30,000	6.00	0.38	4.04%	1.20%	CM-60	
CXHYST	*Carex hystericina*	Porcupine Sedge	5	-5	OBL	1-2.5'	2	N/A								30,000	6.00	0.38	4.04%	1.20%	CM-60	
CXLUPN	*Carex lupulina*	Common Hop Sedge	7	-5	OBL	1.5-3.5	3	N/A								3,300	12.00	0.75	8.09%	0.26%	CM-60	
CXSTRI	*Carex stricta*	Common Tussock Sedge	5	-5	OBL	2.5-4'	3	N/A								53,000	2.00	0.13	1.35%	0.71%	CM-60	
CXUTRI	*Carex utriculata*	Common Yellow Lake Sedge	10	-5	OBL	1-3.5'	3	N/A								10,000	4.00	0.25	2.70%	0.27%	CM-60	
ELEPAL	*Eleocharis palustris*	Great Spike Rush	2	-5	OBL	1-3.5'	2	N/A								51,000	4.00	0.25	2.70%	1.36%	CM-60	
JUNEFF	*Juncus effusus*	Common Rush	7	-5	OBL	2-4'	3	N/A								1,000,000	2.00	0.13	1.35%	13.37%	CM-60	
LEEORY	*Leersia oryzoides*	Rice Cut Grass	4	-5	OBL	2-4'	4	N/A								34,000	16.00	1.00	10.78%	3.64%	N/A	
SCHPUP	*Schoenoplectus pungens var. pungens*	Chairmaker's Rush	5	-5	OBL	2-5'	5	N/A								12,000	4.00	0.25	2.70%	0.32%	CM-60	
SCHTAB	*Schoenoplectus tabernaemontani*	Great Bulrush	5	-5	OBL	4-7'	6	N/A								31,000	12.00	0.75	8.09%	2.49%	CM-60	
SCIATR	*Scirpus atrovirens*	Dark-green Bulrush	4	-5	OBL	2-6'	5	N/A								460,000	4.00	0.25	2.70%	12.30%	CM-60 or M	
SCICYP	*Scirpus cyperinus*	Wool Grass	6	-5	OBL	3-5'	5	N/A								1,700,000	0.125	0.01	0.08%	1.42%	CM-60 or M	
SCHACU	*Schoenoplectus acutus*	Hardstem Bulrush	6	-5	OBL	3-9'	6	N/A								20,000	12.00	0.75	8.09%	1.60%	CM-60 or M	
																Grass/Sedge Subtotals	**5.258**		**56.70%**	**40.14%**		

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM	BLOOM TIME							SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical	COLOR	A	M	J	J	A	S	O				by Weight	by Seed Count		
ACOCAL	*Acorus calamus*	Sweet Flag	7	-5	OBL	1-3'	2	Yellow/Gree								6,800	8.00	0.50	5.39%	0.36%	CM-60	
ALISUB	*Alisma subcordatum*	Mud Plantain	4	-5	OBL	1-3'	3	White								60,000	8.00	0.50	5.39%	3.21%	CM-30	
ASCINC	*Asclepias incarnata*	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink								4,800	4.00	0.25	2.70%	0.13%	CM-30	
CHEGLA	*Chelone glabra*	Turtlehead	8	-5	OBL	3-6'	5	Cream								92,000	2.00	0.13	1.35%	1.23%	CM-120 or M	
EUPPER	*Eupatorium perfoliatum*	Boneset	4	-5	OBL	3-4'	4	White								160,000	4.00	0.25	2.70%	4.28%	CM-30	
EUTMAC	*Eutrochium maculatum*	Spotted Joe-Pye Weed	4	-5	OBL	3-6'	5	Pink								95,000	0.75	0.05	0.51%	0.48%	CM-30	
HIBLAE	*Hibiscus laevis*	Halberd-leaved Rose Mallow	6	-5	OBL	3-6'	5	Pink								2,800	6.00	0.38	4.04%	0.11%	CM-60	
IRIVIS	*Iris virginica var. shrevei*	Southern Blue Flag	5	-5	OBL	1-3'	3	Purple								1,000	12.00	0.75	8.09%	0.08%	CM-120 or M	
LUDALT	*Ludwigia alternifolia*	Seedbox	6	-5	OBL	1.5-3.5	3	Yellow								1,300,000	1.00	0.06	0.67%	8.69%	CM-60	
LYTALA	*Lythrum alatum*	Winged Loosestrife	7	-5	OBL	1-3'	3	Purple								3,000,000	1.00	0.06	0.67%	20.05%	CM-60	
MIMRIN	*Mimulus ringens*	Mookey Flower	6	-5	OBL	1-3'	2	Purple								2,300,000	0.50	0.03	0.34%	7.69%	CM-60	
PENSED	*Penthorum sedoides*	Ditch Stonecrop	5	-5	OBL	1-2'	2	Red								1,300,000	1.00	0.06	0.67%	8.69%	CM-60	
PERHYD	*Persicaria hydropiperoides*	Swamp Smartweed	2	-5	OBL	1-3'	2	White								19,500	8.00	0.50	5.39%	1.04%		
SIUSUA	*Sium suave*	Tall Water Parsnip	7	-5	OBL	2-6'	4	White								50,000	4.00	0.25	2.70%	1.34%	CM-60	
SOLRID	*Solidago riddellii*	Riddell's Goldenrod	7	-5	OBL	2-4'	3	Yellow								93,000	4.00	0.25	2.70%	2.49%	CM-60	
																Wildflower Subtotals	**4.016**		**43.30%**	**59.86%**		
																Mix TOTALS	**9.273**		**100.00%**	**100.00%**		

Plug Species to Diversify Seed Mix - READILY AVAILABLE IN THE NURSERY TRADE

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM	BLOOM TIME							SIZE	PLANTS/ FLAT	FLATS/ ACRE	PLANTS/ ACRE	PLANTS/ SF	% OF TOTAL PLANTS	NOTE*
						Min-Max	Typical	COLOR	A	M	J	J	A	S	O							
CXEMOR	*Carex emoryi*	Emory's Sedge	6	-5	OBL	1-3'	2	N/A									38	43.0	1,634.0	0.04	11.8%	5
CXPELL	*Carex pellita*	Broad-leaved Woolly Sedge	4	-5	OBL	1-3'	2	N/A									38	35.0	1,330.0	0.03	9.6%	
HIBPAL	*Hibiscus palustris*	Swamp Rose Mallow	9	-5	OBL	3-7'	5	White/Pink									50	35.0	1,750.0	0.04	12.6%	
LOBCAR	*Lobelia cardinalis*	Cardinal Flower	7	-5	OBL	2-5'	3	Red									50	35.0	1,750.0	0.04	12.6%	1, 2, 4
LYCAME	*Lycopus americanus*	Water Horehound	5	-5	OBL	1-3'	2	White									38	86.0	3,268.0	0.08	23.6%	5
SAURCER	*Saururus cernuus*	Lizard's Tail	9	-5	OBL	1.5-3'	3	White									32	43.0	1,376.0	0.03	9.9%	5
SPAEUR	*Sparganium eurycarpum*	Great Bur Reed	6	-5	OBL	2-6'	4	White									32	86.0	2,752.0	0.06	19.9%	1
																		361.0	13,860.00	0.32	100.00%	

Plug Species to Diversify Seed Mix - TYPICALLY AVAILABLE THROUGH CONTRACT GROW ONLY

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM	BLOOM TIME							SIZE	PLANTS/ FLAT	FLATS/ ACRE	PLANTS/ ACRE	PLANTS/ SF	% OF TOTAL PLANTS	NOTE*
						Min-Max	Typical	COLOR	A	M	J	J	A	S	O							
CXLACU	*Carex lacustris*	Common Lake Sedge	6	-5	OBL	2.5-4'	3	N/A									38	38.0	1,444.00	0.03	10.7%	
CXLEPT	*Carex leptalea*	Bristlystalked Sedge	10	-5	OBL	1-2'	2	N/A									38	86.0	3,268.00	0.08	24.2%	
LYSTHY	*Lysimachia thyrsiflora*	Tufted Loosestrife	9	-5	OBL	1-2.5'	2	Yellow									38	86.0	3,268.00	0.08	24.2%	
PELVIR	*Peltandra virginica*	Green Arrow Arum	10	-5	OBL	8"-2'	2	Green									32	86.0	2,752.00	0.06	20.4%	2, 3
PONCOR	*Pontederia cordata*	Pickerelweed	10	-5	OBL	1-3'	2	Purple									32	86.0	2,752.00	0.06	20.4%	1, 3, 5
																		382.0	13,484.00	0.31	100.00%	

*Following are the common reasons for not including these recommended plug species within the seed mix:
1) Does not germinate well from seed in the field
2) Seed is very expensive
3) Low number of seeds per ounce
4) Requires specialized microclimate
5) Seed is not commercially available or is only available in small quantities

Coefficients of Conservatism: Swink, F. and G. Wilhelm. 1994. Plants of the Chicago Region. 4th Edition. Indianapolis: Indiana Academy of Science.
Wetness Values: Midwest region values from Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

Germination Codes

N/A: Seed should germinate upon sowing in a warm location; no pretreatment necessary
CM-#: of stratifying days: Seeds germinate after a period of cold, moist stratification
WM-#: of stratifying days: Seeds germinate after a period of warm, moist stratification
B: Hot water treatment
G: Seeds germinate most successfully in cool soil
H: Seeds need scarification
I: Legume, Rhizobium inoculum
J: Remove the hulls from these legume seeds
K: Hemiparasitic species which needs a host plant
L: Plant fresh seed or keep moist
M: Best planted outdoors in the fall
O: Seed needs nicking
S: Fern spore sowing
?: Not sure

Emergent Plug Mix (0-6" Water Depth)

MIX STATISTICS

Average Mix Height (ft)	3.6
Median Mix Height (ft)	3.0
Species Heights (# of Occurrences in Mix)	2' (6), 3' (12), 4' (5), 5' (5), 6' (5)
Number of Native Species in Mix	14
Native FQI	29.1
Native Mean C Value	5.5
Native Mean W Value	-4.9
National Wetland Category	OBL
Plants per Square Foot	0.8

Mix Description: Designed for consistently inundated areas that contain shallow standing water (up to 6" of consistent water depth). In addition to the traditional wetland application, this mix is also ideal for use directly adjacent to the waterline of pond shorelines where the water level consistently remains up to 6" deep. It is ideal for establishing vegetation along engineered ponds that have a "safety shelf" designed along the shoreline. This mix is designed for wetland and pond applications without constant water flow. The species composition has been customized to your site and application to have a good balance of grasses, sedges, rushes and wildflowers.

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM	BLOOM TIME							SIZE	% OF TOTAL	NOTE*
						Min-Max	Typical	COLOR	A	M	J	J	A	S	O			
CALCAN	*Calamagrostis canadensis*	Blue Joint Grass	3	-5	OBL	2-5'	4	N/A								2" plug	1.50%	18" o.c. (A. Rhizomatous)
CXCOMO	*Carex comosa*	Bristly Sedge	5	-5	OBL	2-3.5'	2	N/A								2" plug	5.00%	18" o.c. (S. Rhizomatous)
CXLACU	*Carex lacustris*	Common Lake Sedge	6	-5	OBL	2.5-4'	3	N/A								2" plug	2.00%	18" o.c. (A. Rhizomatous)
CXLUPN	*Carex lupulina*	Common Hop Sedge	7	-5	OBL	1.5-3.5	3	N/A								2" plug	1.50%	18" o.c. (Rhizomatous)
CXSTRI	*Carex stricta*	Common Tussock Sedge	5	-5	OBL	2.5-4'	3	N/A								2" plug	2.00%	18" o.c. (S. Rhizomatous)
CXTRIC	*Carex trichocarpa*	Hairy-fruited Lake Sedge	7	-5	OBL	2.5-4'	4	N/A								2" plug	5.00%	18" o.c. (A. Rhizomatous)
CXVULP	*Carex vulpinoidea*	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A								2" plug	5.50%	18" o.c. (S. Rhizomatous)
JUNEFF	*Juncus effusus*	Common Rush	7	-5	OBL	2-4'	3	N/A								2" plug	1.00%	18" o.c. (S. Rhizomatous)
LEEORY	*Leersia oryzoides*	Rice Cut Grass	4	-5	OBL	2-4'	4	N/A								2" plug	2.00%	18" o.c. (A. Rhizomatous)
SCHACU	*Schoenoplectus acutus*	Hardstem Bulrush	6	-5	OBL	3-9'	6	N/A								2" plug	1.00%	18" o.c. (A. Rhizomatous)
SCHTAB	*Schoenoplectus tabernaemontani*	Great Bulrush	5	-5	OBL	4-7'	6	N/A								2" plug	3.00%	18" o.c. (A. Rhizomatous)
SCHPUN	*Scirpus pungens*	Chairmaker's Rush	5	-5	OBL	2-5'	5	N/A								2" plug	5.00%	18" o.c. (A. Rhizomatous)
SCIATR	*Scirpus atrovirens*	Dark-green Bulrush	4	-5	OBL	2-6'	5	N/A								2" plug	1.00%	18" o.c. (Rhizomatous)
SCICYP	*Scirpus cyperinus*	Wool Grass	6	-5	OBL	3-5'	5	N/A								2" plug	2.00%	18" o.c. (S. Rhizomatous)
																/Sedge Sub	**37.50%**	

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM	BLOOM TIME							SIZE	% OF TOTAL	NOTE*
						Min-Max	Typical	COLOR	A	M	J	J	A	S	O			
ACOCAL	*Acorus calamus*	Sweet Flag	7	-5	OBL	1-3'	2	ellow/Gree								2" plug	3.00%	18" o.c. (Rhizomatous)
ALISUB	*Alisma subcordatum*	Mud Plantain	4	-5	OBL	1-3'	3	White								2" plug	1.00%	18" o.c.
ASCINC	*Asclepias incarnata*	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink								2" plug	3.00%	18" o.c. (S. Rhizomatous)
EUTMAC	*Eutrochium maculatum*	Spotted Joe Pye Weed	4	-5	OBL	3-6'	5	Pink								2" plug	2.00%	18" o.c.
HIBLAE	*Hibiscus laevis*	Halberd-leaved Rose Mallow	6	-5	OBL	3-6'	5	Pink								2" plug	3.00%	18" o.c.
IRIVIS	*Iris virginica var. shrevei*	Southern Blue Flag	5	-5	OBL	1-3'	3	Purple								2" plug	12.00%	12" o.c. (Rhizomatous)
LOBCAR	*Labelia cardinalis*	Cardinal Flower	7	-5	OBL	2-5'	3	Red								2" plug	2.00%	18" o.c.
LYCAME	*Lycopus americanus*	Water Horehound	5	-5	OBL	1-3'	2	White								2" plug	1.50%	18" o.c.
LYTALA	*Lythrum alatum*	Winged Loosestrife	7	-5	OBL	1-3'	3	Purple								2" plug	2.00%	18" o.c. (Rhizomatous)
MIMRIN	*Mimulus ringens*	Monkey Flower	6	-5	OBL	1-3'	2	Purple								2" plug	3.00%	18" o.c.
PONCOR	*Pontederia cordata*	Pickerelweed	10	-5	OBL	1-3'	2	Purple								2" plug	2.00%	18" o.c. (Rhizomatous)
SAGLAT	*Sagittaria latifolia*	Common Arrowhead	4	-5	OBL	1-3'	3	White								2" plug	13.00%	12" o.c. (Rhizomatous)
SOLRID	*Solidago riddellii*	Riddell's Goldenrod	7	-5	OBL	2-4'	3	Yellow								2" plug	2.00%	18" o.c. (S. Rhizomatous)
SPAEUR	*Sparganium eurycarpum*	Great Bur Reed	6	-5	OBL	2-6'	4	White								2" plug	13.00%	18" o.c. (Rhizomatous)
																flower Subt	**62.50%**	
																Mix TOTALS	**100.00%**	

Coefficients of Conservatism: Swink, F. and G. Wilhelm. 1994. Plants of the Chicago Region. 4th Edition. Indianapolis: Indiana Academy of Science.
Wetness Values: Midwest region values from Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

S. Rhizomatous - Slowly Rhizomatous, spreads but typically stays localized forming small clumps or groups
Rhizomatous - Spreads readily locally forming moderate to large groupings
A. Rhizomatous - Aggresivly Rhizomatous, spreads quickly and may become dominant throughout a planting area if conditions are ideal

Local Natural Area Contractors

This list is for reference only, not a recommendation.

Pizzo Group, Leland, IL
Phone: (815) 495-2300

Encap, Inc., DeKalb, IL
Phone: (815) 748-4500

Tallgrass Restoration
Phone: (847) 925-9830

Applied Ecological Services, West Dundee, IL
Phone: (847) 844-9385

Conservation Land Stewardship, LLC, Elmhurst, IL
Phone: (630) 559-2035

Cardno JF New, Walkerton, IN
Phone: (574) 586-3400

Natural Resources Management, Beecher, IL
Phone: (708) 935-2100

Itegrated Lakes Management, Waukegan IL
Phone: (847) 244-6662

Native Plant & Seed Suppliers

This list is for reference only, not a recommendation.

Native Seed

Agrecol, Inc., Evansville, WI
Phone: (608) 223-3571

Feder's Prairie Seed Company, Blue Earth, MN
Phone: (507) 526-3049

Ion Exchange, Harpers Ferry, IA
Phone: (563) 535-7231

Prairie Moon Nursery, Winona, MN
Phone: (507) 452-1362

Shooting Star Native Seeds, Spring Grove, MN
Phone: (507) 498-3944

Spence Restoration Nursery, Muncie, IN
Phone: (765) 286-7154

Native Plugs

Agrecol, Inc., Evansville, WI
Phone: (608) 223-3571

Genesis Nursery, Inc., Tampico, IL
Phone: (877) 817-5325

J&J Transplant Aquatic Nursery, LLC, Wild Rose, WI
Phone: (800) 622-5055

Midwest Natural Garden, St. Charles, IL
Phone: (847) 742-1792

Spence Restoration Nursery, Muncie, IN
Phone: (765) 286-7154

Pizzo Native Plant Nursery, LLC, Leland, IL
Phone: (815) 495-2300

Native Trees & Shrubs

Bailey Nurseries, Inc., St. Paul, MN
Phone: (708) 935-5974

Forrest Keeling Nursery, Elsberry, MO
Phone: (573) 898-5571

Kankakee Nursery Co., St. Anne, IL
Phone: (815) 937-9358

Possibility Place Nursery, Monee, IL
Phone: (708) 534-3988

Invasive Species List

It is the responsibility of the Natural Areas Contractor to locate, identify, and eradicate any species that may endanger the successful establishment and long-term health of the specified native plant communities within the project area/site. Following is a list of common invasive, weedy and aggressive native species typically encountered during ecological restoration efforts that can inhibit the successful establishment of desirable native species. This list is not representative of the site and should not be considered an inventory. The listed species shall at no time be allowed to dominate any portion of the project site.

Aggressive Weed/Invasive Species List:

Acer negundo	BOXELDER[3]
Acer platanoides	NORWAY MAPLE
Achillea spp.	YARROW[3]
Aegopodium podagraria	GOUTWEED
Agrostis gigantea	REDTOP
Agrostis stolonifera	CREEPING BENTGRASS
Ailanthus altissima	TREE OF HEAVEN
Alliaria petiolata	GARLIC MUSTARD
Alnus glutinosa	EUROPEAN BLACK ALDER
Ambrosia artemisiifolia	COMMON RAGWEED[1, 3]
Ambrosia trifida	GIANT RAGWEED[1, 3]
Anthriscus sylvestris	WILD CHERVIL
Arctium minus	COMMON BURDOCK
Berberis thunbergii	JAPANESE BARBERRY
Brassica nigra	BLACK MUSTARD
Bromus inermis	SMOOTH BROME
Bromus tectorum	DOWNY BROME
Butomus umbellatus	FLOWERING RUSH
Cannabis sativa	MARIJUANA[1]
Carduus nutans	MUSK THISTLE[1]
Celastrus orbiculatus	ASIAN BITTERSWEET[1]
Centaurea maculosa	SPOTTED KNAPWEED
Chenopodium album	LAMB'S QUARTERS[2]
Cirsium arvense	CANADA THISTLE[1]
Cirsium vulgare	BULL THISTLE
Conium maculatum	POISON HEMLOCK[1]
Cornus racemosa	GRAY DOGWOOD[3]
Cynanchum louiseae	BLACK SWALLOW-WORT
Cynanchum rossicum	PALE SWALLOW-WORT
Cyperus esculentus	YELLOW NUTSEDGE[3]
Dactylis glomerata	ORCHARDGRASS
Daucus carota	QUEEN ANNE'S LACE[2]
Dioscorea oppositifolia	CHINESE YAM
Dipsacus spp.	TEASEL[1]
Echinochloa crus-galli	BARNYARD GRASS
Egeria densa	BRAZILIAN WATERWEED
Eichhornia crassipes	WATER HYACINTH
Elaeagnus angustifolia	RUSSIAN OLIVE[1]
Elaeagnus pungens	THORNY OLIVE[1]
Elaeagnus umbellata	AUTUMN OLIVE[1]
Elymus repens	QUACKGRASS
Erigeron canadensis	MARE'S TAIL[3]
Erigeron annuus	ANNUAL FLEABANE[3]
Erigeron strigosus	DAISY FLEABANE[3]
Euonymus alatus	BURNING BUSH
Euonymus fortunei	WINTERCREEPER
Euphorbia esula	LEAFY SPURGE
Fallopia japonica	JAPANESE KNOTWEED[1]
Fallopia sachalinensis	GIANT KNOTWEED[1]
Fallopia × bohemica	BOHEMIAN KNOTWEED[1]
Frangula alnus	GLOSSY BUCKTHORN
Hedera helix	ENGLISH IVY
Hemerocallis fulva	ORANGE DAYLILY
Heracleum mantegazzianum	GIANT HOGWEED[1]
Hesperis matronalis	DAMES ROCKET
Humulus japonicus	JAPANESE HOPS
Hydrilla verticillata	HYDRILLA
Hydrocharis morsus-ranae	EUROPEAN FROGBIT
Hypericum perforatum	COMMON ST. JOHN'S WORT
Ipomoea purpurea	MORNING GLORY[2]
Iris pseudacorus	YELLOW IRIS
Lespedeza cuneata	SERICEA LESPEDEZA
Ligustrum spp. (non-native)	PRIVET (non-native)
Lolium multiflorum	ANNUALRYE/ITALIAN RYEGRASS
Lonicera spp.	HONEYSUCKLE (non-native)[1]
Lotus corniculatus	BIRDS FOOT TREFOIL
Lysimachia nummularia	MONEYWORT
Lythrum salicaria	PURPLE LOOSESTRIFE
Marsilea quadrifolia	EUROPEAN WATERCLOVER
Medicago lupulina	BLACK MEDIC
Medicago sativa	ALFALFA
Melilotus albus	WHITE SWEET CLOVER
Melilotus officinalis	YELLOW SWEET CLOVER
Microstegium vimineum	JAPANESE STILTGRASS
Morus alba	WHITE MULBERRY
Myosotis sylvatica	GARDEN FORGET-ME-NOT
Myriophyllum aquaticum	PARROT FEATHER
Myriophyllum spicatum	EURASIAN WATERMILFOIL

APPENDIX D

Invasive Species List, contd.

Myosotis scorpioides	WATER FORGET-ME-NOT
Najas minor	BRITTLE WATERNYMPH
Nepeta cataria	CATNIP
Nymphoides peltata	YELLOW FLOATING HEART
Oenothera biennis	EVENING PRIMROSE[3]
Onopordum acanthium	SCOTCH THISTLE
Pastinaca sativa	WILD PARSNIP
Phalaris arundinacea	REED CANARY GRASS
Phragmites australis (non-native)	COMMON REED (non-native)
Pistia stratiotes	WATER LETTUCE
Poa pratensis	KENTUCKY BLUEGRASS
Populus alba	WHITE POPLAR
Populus deltoides	COTTONWOOD[3]
Potamogeton crispus	CURLY-LEAF PONDWEED
Pueraria montana var. lobata	KUDZU[1]
Ranunculus ficaria	LESSER CELANDINE[1]
Rhamnus cathartica	COMMON BUCKTHORN
Robinia pseudoacacia	BLACK LOCUST
Rorippa nasturtium	WATERCRESS
Rumex acetosella	SHEEP SORREL
Rumex crispus	CURLY DOCK
Rosa multiflora	MULTIFLORA ROSE
Rubus spp.	RASPBERRY/BLACKBERRY[3]
Salix interior	SANDBAR WILLOW[3]
Saponaria officinalis	BOUNCING BET
Schedonorus arundinaceus	TALL FESCUE
Securigaria varia	CROWN VETCH
Setaria spp.	FOXTAIL/MILLET[2]
Silene latifolia var. alba	BLADDER CAMPION
Solidago altissima	TALL GOLDENROD[3]
Solidago canadensis	CANADA GOLDENROD[3]
Solidago sempervirens	SEASIDE GOLDENROD
Sonchus arvensis	PERENNIAL SOWTHISTLE[1]
Sorghum almum	COLUMBUS GRASS[1]
Sorghum halepense	JOHNSONGRASS[1]
Symphyotrichum lateriflorum	SIDE FLOWERING ASTER[3]
Symphyotrichum pilosum	HAIRY ASTER[3]
Tamarix spp.	SALT CEDAR[1]
Tanacetum vulgare	COMMON TANSY
Taraxacum officinalis	COMMON DANDELION[2]
Thlaspi arvense	FIELD PENNYCRESS[2]
Torilis japonica	JAPANESE HEDGE PARSLEY
Toxicodendron radicans	POISON IVY[3]
Trifolium pratense	RED CLOVER[2]
Trifolium repens	WHITE CLOVER[2]
Typha angustifolia	NARROWLEAF CATTAIL[3]
Typha latifolia	COMMON CATTAIL[1,3]
Ulmus pumila	SIBERIAN ELM
Verbascum blattaria	MOTH MULLEIN[2]
Verbascum thapsus	COMMON MULLEIN2[2]
Vinca minor	PERIWINKLE
Xanthium strumarium	ROUGH COCKLEBUR

1 Species classified as a Noxious Weed in the State of Illinois as of the date of this document
2 Species considered common weeds requiring control, not specifically considered invasive
3 Species considered native (or questionably native) in the State of Illinois, but often has an aggressive growth behavior that may require control on a case-by-case basis

SUBMITTAL CHECKLIST

General Requirements

- ❑ Four complete bound sets of the intended construction plans which must include a complete sheet index and the original signature & seal of the professional designer, landscape architect, or engineer
- ❑ One set of specifications, if not included in the drawings themselves, stamped with the seal & signature of the professional designer, landscape architect, or engineer
- ❑ Completed and signed application forms
- ❑ Brief description of the proposed project including the type of development, total parcel or site size, size of the area under development
- ❑ Provide estimated schedule of operation

Cover Sheet

- ❑ Name of project
- ❑ Common address and legal description of the site where the development will take place
- ❑ Index of Sheets
- ❑ Location Map
- ❑ Name, telephone number, and address of owner/ developer
- ❑ Name(s), telephone number(s), and address(es) of landscape architecture, engineering and/or consulting firms
- ❑ List of utility companies with telephone numbers providing services for the site
- ❑ General construction notes
- ❑ Site benchmark tied to USGS datum

Site Plans

- ❑ Outboundary information including property lines, lot dimensions, and all pertinent recorded easements
- ❑ North arrow and graphic scale of at least one inch to 100 feet or less
- ❑ Legend
- ❑ Date of original preparation and any revisions
- ❑ Total acreage of site
- ❑ Adjacent parcel owner information
- ❑ Existing and proposed building structures and streets or alleys
- ❑ Size and location of existing trees
- ❑ Show the location of utilities on site

Restoration Plans

- ❑ North arrow and graphic scale of at least one inch to 100 feet or less
- ❑ Legend
- ❑ Match lines and/or plan sheet key (if necessary)
- ❑ Property or boundary lines
- ❑ Location of all access and staging areas
- ❑ Existing and proposed structures, parking lots, driveways, sidewalks, pathways, trails, and other impervious areas on the site
- ❑ Delineation of any existing wetlands and wetland buffers on or within 100 feet of the site
- ❑ Size and location of proposed detention or retention basin(s) including high water level, normal water level, and open water elevations
- ❑ Size and location of existing trees and vegetation areas on the site
- ❑ Tree protection fencing for all trees over 24" on site located within construction zone
- ❑ Clearing and treatment areas and strategies including existing vegetation, trees, and/or shrubs to be removed and methods for removal (for example mechanical removal , hand cutting, herbicides etc.)
- ❑ Proposed plant schedule and species lists with scientific names, plant sizes, and quantities
- ❑ Location of all proposed plants and seeding areas
- ❑ Location of all proposed waterfowl enclosures on plan or described in specification
- ❑ Plant installation details

Grading and Utility Plan checklists found on following page

APPENDIX E

SUBMITTAL CHECKLIST, CONTD.

Grading and Utility Plans

- ❑ Delineated limits of any flood protection areas on the site
- ❑ Delineation of the pre-development and post-development regulatory floodplain and regulatory floodway
- ❑ Delineation of any existing wetlands and wetland buffers on or within 100 feet of the site
- ❑ Construction access to site
- ❑ Hauling routes
- ❑ Provide existing and proposed contours at 1 foot intervals of the entire site and 100 feet beyond the site
- ❑ Top of foundation, lowest floor, lowest entry elevation, and floodproofing elevations of all existing structures within 100 feet of the development area
- ❑ Show grading limits
- ❑ Estimated grading quantity
- ❑ Size and location of existing trees
- ❑ Existing stormwater facilities including pipes, field tile, culverts, and inlets on the entire site and 50 feet beyond the site
- ❑ Existing utilities including sanitary, storm, water main, or any other utilities that existing on the site
- ❑ Show all proposed improvements which includes but is not limited to:
- ❑ Storm sewers
- ❑ Sanitary sewers and laterals
- ❑ Water lines, hydrants, valves, and meter settings
- ❑ Streets
- ❑ Street lights & street signs
- ❑ Sidewalks and handicap ramps
- ❑ Information regarding the invert and rim elevations, pipe sizes, pipe lengths, and material types for all proposed improvements
- ❑ Size and location of proposed detention or retention basin(s) including high water level, normal water level, and open water elevations
- ❑ Siltation and erosion control and details
- ❑ Siltation basins and calculations
- ❑ Density of proposed fills
- ❑ Show any proposed retaining walls and construction details
- ❑ Note on plan to provide Village with copy of grading compaction test results

Examples of Installations

Existing Conditions - A retention basin "Green Retrofit". Planted in July 2004, notice there is nothing growing in the water.

One week after planting - Photo illustrates goose exlosure, erosion control blanket, shoreline plug planting, and aquatic plug planting (July 2004).

One year after planting - There is a mass establishment of native wildflowers and wetland vegetation even during drought (July 2005).

Two years after planting - There is a beautiful and functional wildflower and wetland planting that serves as habitat for local wildlife. The wetland plants cover the basin bottom and increase water quality (July 2006).

APPENDIX F

Examples of Installations

Existing Conditions - Agricultural Farm Field in Illinois (2008)

Two years after restoration - Black-eyed Susan in full bloom (July 2010).

Monarda & Ratibida in bloom after three years of stewardship after installation which included mowing and selective herbicide applications to control invasive species and promote the growth of native species. (July 2011).

Aerial photography showing the drastic difference and increased forb presence before and after restoration.

Hydrograph Information

Storm Design Hydrographs

It is important to understand the basics of stormwater management design, because how a basin functions hydrologically directly affects the species selection, installation and management methodologies regarding native planting. First, in order to appropriately size a stormwater management system, the time of concentration (TOC) must be calculated for the basin. TOC is the time that it takes for drops of water to concentrate after falling on your site during a rain event and travel to the basin where it will be detained. Next, the total potential volume of water must be calculated. Typically the "100-year" storm event is used as a worst case scenario, this simply means that there is a 1 in 100 (or 1%) chance that a rainfall of this caliber will occur in a given year and is based off of historical rainfall data. TOC and water volume calculations are also typically figured for the smaller, more common rainfall events as well including the 50-year (2%), 25-year (4%), 10-year (10%), 5-year (20%) and 2-year (50%) storm events. Based upon TOC and water volume calculations, all basins, swales and pipes are designed to accommodate peak flows and water volume. The data produced can be displayed graphically in what is termed a Hydrograph (Figure G-1). This graph shows a detention basin's 100-year, 50-year, and 25-year peak water levels and duration of water presence. Figure G-2 is the data for the 25-year storm event used to create the graph. The first column of the table is the amount of time that passes and the second is the water level. For example, during a 25-year storm event a basin might have zero inches of standing water after 15 minutes, but as the storm progresses more water will accumulate and the table will show an increase of volume (i.e. 0.75 feet of water may be present after 10 hours, 1.0 foot after 14 hours, etc.). Once the basin reaches its peak, the numbers will start to decline.

This information is critical when developing a planting plan for a basin or body of water. If it is known that a certain level of the basin will be inundated with water for long periods of time, it is best to choose plants that will thrive in saturated conditions. If the graph illustrates that the water will rarely reach a higher level and the plants will not be inundated, species that tolerate dry conditions should be specified. Thoughtful planting design and seed selection gives consideration to not only the colors and textures of the plants but also the conditions in which they can live and thrive.

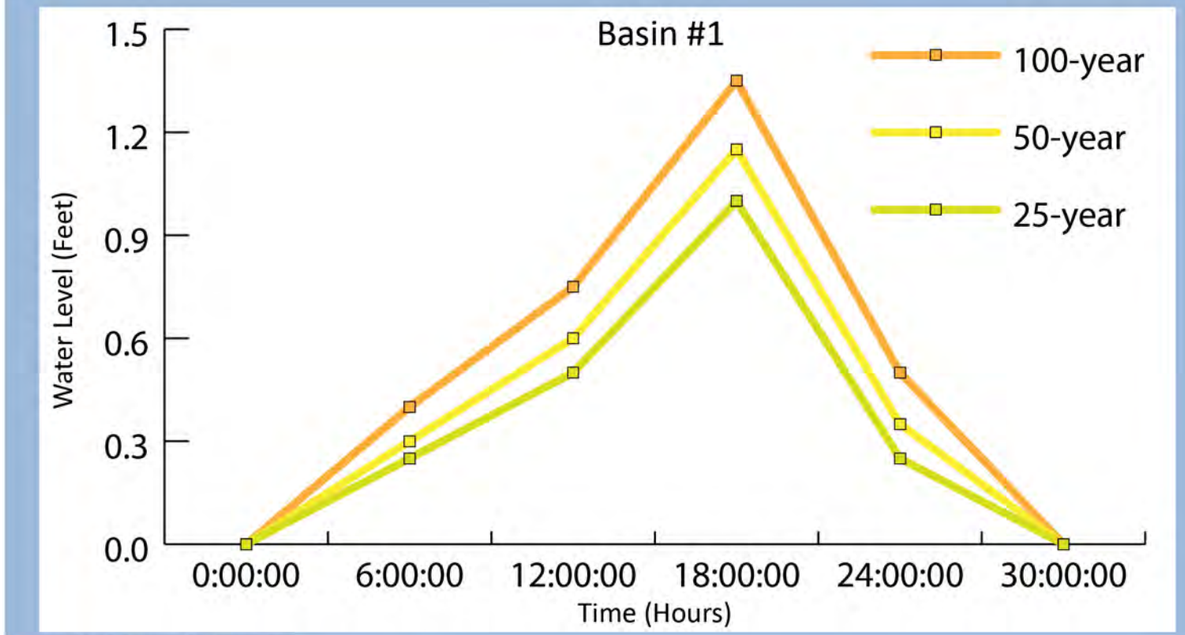


Figure G-1: Storm Hydrograph

Basin #1 - 25 Year Storm Event		
Days	Hours	Level (ft)
0	0:00:30	0
0	8:29:00	0.25
0	12:07:30	0.5
0	13:36:00	0.75
0	14:47:00	1
0	16:04:00	1.09
0	17:44:30	1
0	19:49:00	0.75
0	22:11:30	0.5
1	1:20:00	0.25
2	13:45:30	0
3	23:59:30	0
4	0:00:00	0

Figure G-2: Storm Hydrograph Data

Figure G-3: Successful Naturalized Detention Basin

APPENDIX H

References & Additional Information

Village of Lemont
Unified Development Ordinance
http://www.lemont.il.us/documentcenter/view/124

USDA Illinois Native Plant Guide – General Design, Application, & Management Considerations
https://archive.epa.gov/greenacres/web/html/chap1.html

A Source Book on Natural Landscaping for Public Officials
https://archive.epa.gov/greenacres/web/html/chap1.html

City of Chicago: A Guide to Stormwater Best Management Practices
http://www.cdfinc.com/xm_client/client_documents/Chicago_GuideTo_Stormwater_BMPs.pdf

EPA Storm Water Technology Fact Sheet – Wet Detention Ponds
http://nepis.epa.gov/Exe/ZyPDF.cgi/200044D0.PDF?Dockey=200044D0.PDF

Natural Resources Conservation Service: Bioswales. . . absorb and transport large runoff events
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_029251.pdf

APPENDIX I

Glossary

Acceptable Species: Vegetative species that have been seeded or planted as specified and/or volunteer native species with a C-value of 2 or greater, except for those species listed in Appendix-A.

Aerial coverage: The vegetation covering the ground surface above the ground surface; including all leaves, stems, flower parts, etc. Aerial coverage can be visualized by considering a bird's-eye view of the vegetation.

Applicant: The party seeking project approval from the Village. Ultimately the Applicant is the responsible party for ensuring that this document is followed, however in the context of the document "Applicant" may include those contractors or individuals in which certain responsibilities have been delegated (i.e. General Contractor, Grading Contractor, Landscape Contractor, etc.)

Burn Boss: A term used in relation to prescribed fire activities, the Burn Boss is the person in command during the execution of a controlled burn within a native planting area.

Cover: The vertical projection of vegetation from the ground as viewed from above.

Density: Numbers of individuals or stems per unit area.

Director: The party from the Village of Lemont responsible for approval of all plans and permits.

Dominant Species: Plant species or species groups, which by means of their number, coverage or size, have considerable influence or control upon the conditions or existence of associated species.

Erosion: The washing away or dislodging of soil by water, wind or ice.

Established: Establish is defined in botany as a species being allowed to thrive and reproduce.

Invasive Species: An undesirable species of plant or animal, often non-native, that competes with desirable, native plants and animals for light, space, water, food and nutrients. An invasive species, left untreated, will destroy the integrity of an ecosystem and will often become the only plant or animal inhabiting a particular landscape.

Native Species: 1) an indigenous species that is normally found as part of a particular ecosystem. 2) a species that was present in a defined North American area prior to European settlement.

Ocular Assessment: The act of making a professional judgment about something based on what is physically seen by the observers eyes.

Plant Community: A group of plants that need a particular set of environmental conditions (i.e. light, soil type, moisture) in order to thrive. Examples include dry prairie, mesic prairie, wet prairie, wetland, emergent, savanna, dry-mesic woodland, etc.

Planting Area: The physical area(s) of a project site receiving site preparation, planting and/or stewardship activities. A plant community may consist of multiple planting areas.

Quadrat: Small areas of a standard size placed along transects or selected at random to act as representative samples for assessing the local distribution of plants or animals.

Remnant: A surviving trace or vestige of vegetation that has remained undisturbed or minimally undisturbed since European settlement. Remnant habitats are often found in fragmented form dissected by human development with a highly diverse number of native plants or native indicator species.

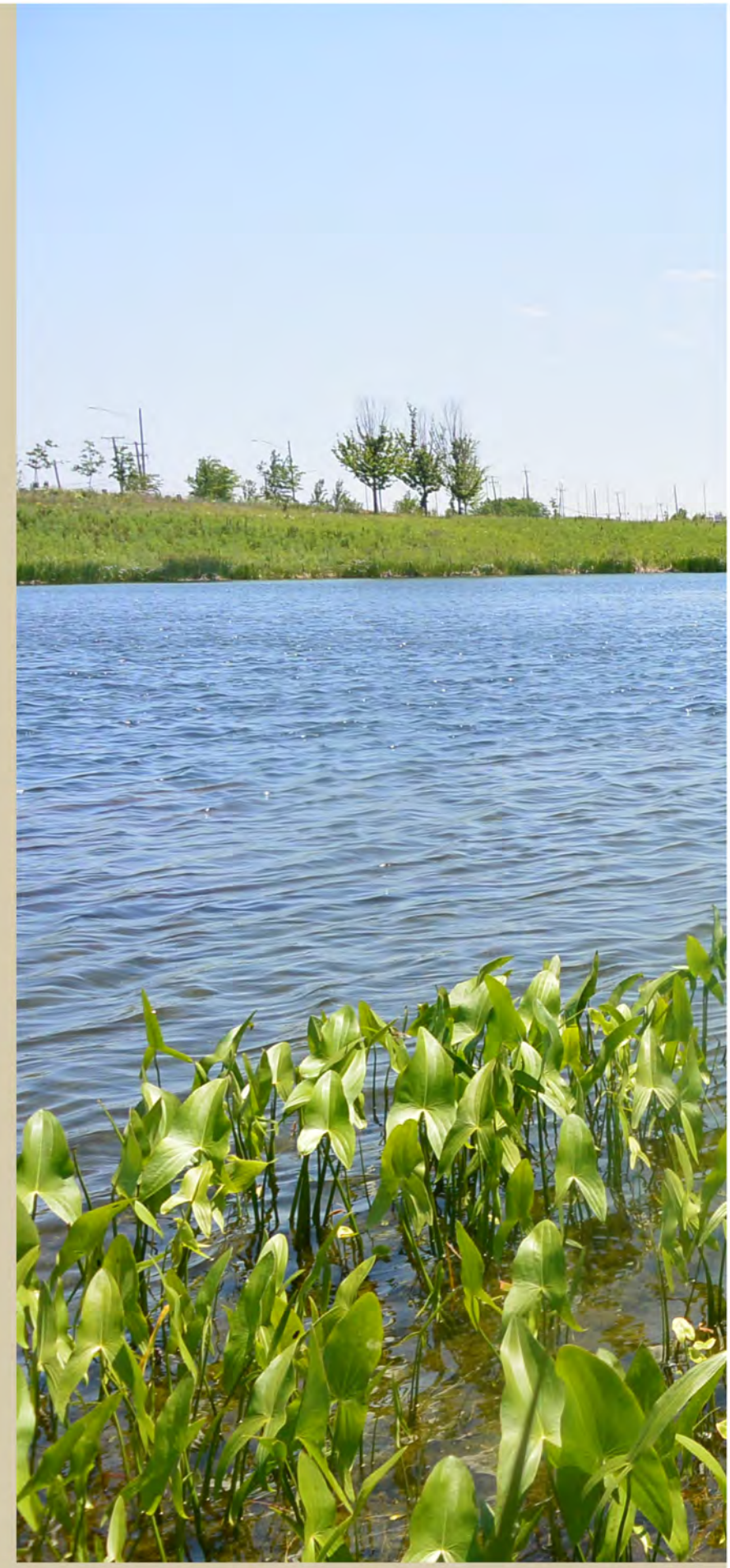
Transect: A straight line through a natural feature or across the earth's surface, along which observations are made or measurements taken.

Vegetative Cover: The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Vegetative cover may exceed 100 percent.

Vigorous: Well-rooted in soil and displaying healthy, strong vegetative growth.

Village: The Village of Lemont

Village Ecologist: The party assigned by the Village of Lemont to review plans, review contractor submittals and conduct material or site inspections regarding native landscape planting or management.



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