Successful School Rain Gardens

Jamie Stamberger

Stamberger
Outreach Consulting

Agenda

- What are they again? (not including how to today)
- Why build them at schools?
- School rain garden check list
- Jamie's notes from the field
- Case studies
- Questions

Rain Gardens

What are they again?

Many reasons to build them at schools!

- Many people go to schools (great public demonstration)
- Opportunity for youth education
- Capture lots of runoff (large impervious surface area)
- Future sites for rain garden workshops/tours
- Potential for ongoing stewardship
- Satisfy both education/outreach and water quality NPDES requirements

School Rain Garden Check List

- Contact schools/teachers, SDs, for general interest/willingness
- Site visits: identify suitable sites (space, access to plumbing, visibility)
- Get Principal approval for identified sites
- Get SD Maint. general approval for project
- Create formal project plan, formal SD permission form approved
- Create rain garden team
- Work with teachers to develop curriculum/lessons/rain garden activities/ongoing use/work days
- Develop planting plan (involve students!!)
- Get any permits needed (plumbing?)
- Hire contractors as needed (plumber, excavator)
- Excavate, install plumbing, armor inflow/outflow prep garden for planting
- Plant with students
- Cover exposed soil
- Install interpretive signage
- Provide maintenance support
- Check in

Important things I have learned…

Lesson 1: A lot goes in to rain garden day.

Interpretive Signage
(art work, bids, order, install)

Relationships/Communications (SD, teachers, RG team, parents)

Education Planning
(student activities, classroom lessons, aligning to curriculum, getting materials, training your helpers)

Planning for Maintenance
(weeding guides, trainings, agreements, calendars, support)

Rain Garden Day!

Project Design
(garden shape/size, utility locates, irrigation systems, engineering, plumbing, planting plan, who will build it?)

Project Management
(hire/oversee contractors, purchase plants, bark, rock, deliveries/pick ups, tools for students)

Scheduling
(students, excavation, permits, contractors, locates, plants, materials)

Permissions
(SD, county/city, maintenance dept)

Can make you feel…

Overwhelmed….

Careful calendar management can save you!

- Spend time on your Google/Outlook calendar, paper calendar, add reminders and due dates
- Start at the project installation window and work backwards
- Keep a check list of tasks
- Allow 6-12 months for project planning
- Work around teacher schedules
- Challenges: sports, recess, drop off and pick up times
- Opportunities: in-service days, holidays, vacation days, weekends

Lesson 2. There may be surprises underground.

CALL LOCATES! (811)

IRRIGATION SYSTEMS ON SITE?

- School Districts can sometimes help with private on site utilities locates
- District Maintenance Depts. May also have records and diagrams of irrigation systems

Lesson 3. You will need permissions and permits.

- Schools have a permission/application process
- Need Maintenance Department approval
  - Ensure no added maintenance, unless they agree
- Need Principal approval
- Cities, towns and counties often have building permit requirements
  - Usually Plumbing Permit
  - Call them, rain garden retrofits are new in many places
  - Plumbers often need your support
  - Sometimes, commercial buildings need an engineer-stamped drawing

Lesson 4. Maintenance planning is critical.

- Most critical piece of the project: the point is rain garden demonstration, keep it looking good!
- Don't saddle Maintenance Dept. with your project, preserve your good relationships
- Rain Garden Team: Lots of turn over at schools (parents, teachers, administrators)
- Maintenance agreements: non-binding MOU
- Support (materials, guides), ask
- Continued check ins, 1-2 times/year or seasonally
- May need to boost occasionally

Lesson 5. More impactful if students are meaningfully involved.

- Give authentic opportunity for design/process input
  - What can they decide that you can make happen?
  - Plant choices
  - Voting for location, shape
  - Doing drainage tests for you
  - Rain garden sizing activities
  - Garden art, signage
- Helpful to visit classes for background/input before project
- Site tours before project
- Don't make them do all the digging
- Do involve in planting, mulching, weeding, light digging ok

Lesson 6. Teachers are busy… and these projects can help!

- Should be additive and support their work, not detract or ask for a lot of their time and energy.
- Teacher visits to align your work with theirs
  - How can you support their curriculum?
  - Can you align to Next Generation Science Standards?
- Careful schedule planning
- Schedule early, be flexible
- If offsite, may need to provide bus funding
- Bring extra helpers if you need them

Lesson 7. There are 5 million amazing activities you can do with youth in a rain garden setting.

- Who am I? plant game
- Rain garden picture story
- Planting
- Mulching
- Drainage tests
- Soil investigation
- Rain garden flow modeling/sizing (applied mathematics)
- Plant selection from plant guides, drawing planting plans
- Garden artwork
- Soil testing
- Turbidity monitoring

Lesson 8. You can involve A LOT of students in one rain garden project.

- Rotating stations: educational, planting, mulching, weeding, counting things, collecting data, creating art
- Pair two students to one plant when desperate
- Older youth can mentor younger youth

Lesson 9. Older students make amazing mentors.

- Younger kids look up to older kids
- Older kids feel proud and responsible, are attentive and do a great job
- Everyone has fun
- You can involve a lot of students in a small project
- Organize older students first, give instructions, pair one to one or several younger to one older

Case Studies

Whitcomb Elementary School

(Clackamas County Service District #1 Water Environment Services)

- A project of Clackamas County Water Environment Services, Watershed Health Education Program
- Captures runoff from 3,500 sf of roof, 98,000 gals of runoff per year
- Permissions from N. Clackamas SD, plumbing permit from Clackamas Co. building dept., engineer drawing not required
- Planted by 3rd grade, with help from Clackamas Web Academy and Sabin Schellenberg HS students
- Excavated and plumbed by contractors (Todd Blossom)
- Plant ID and weeding guide to support maintenance
- Three rotating stations: who am I plant game, rain garden picture story, planting/weeding/watering/mulching station


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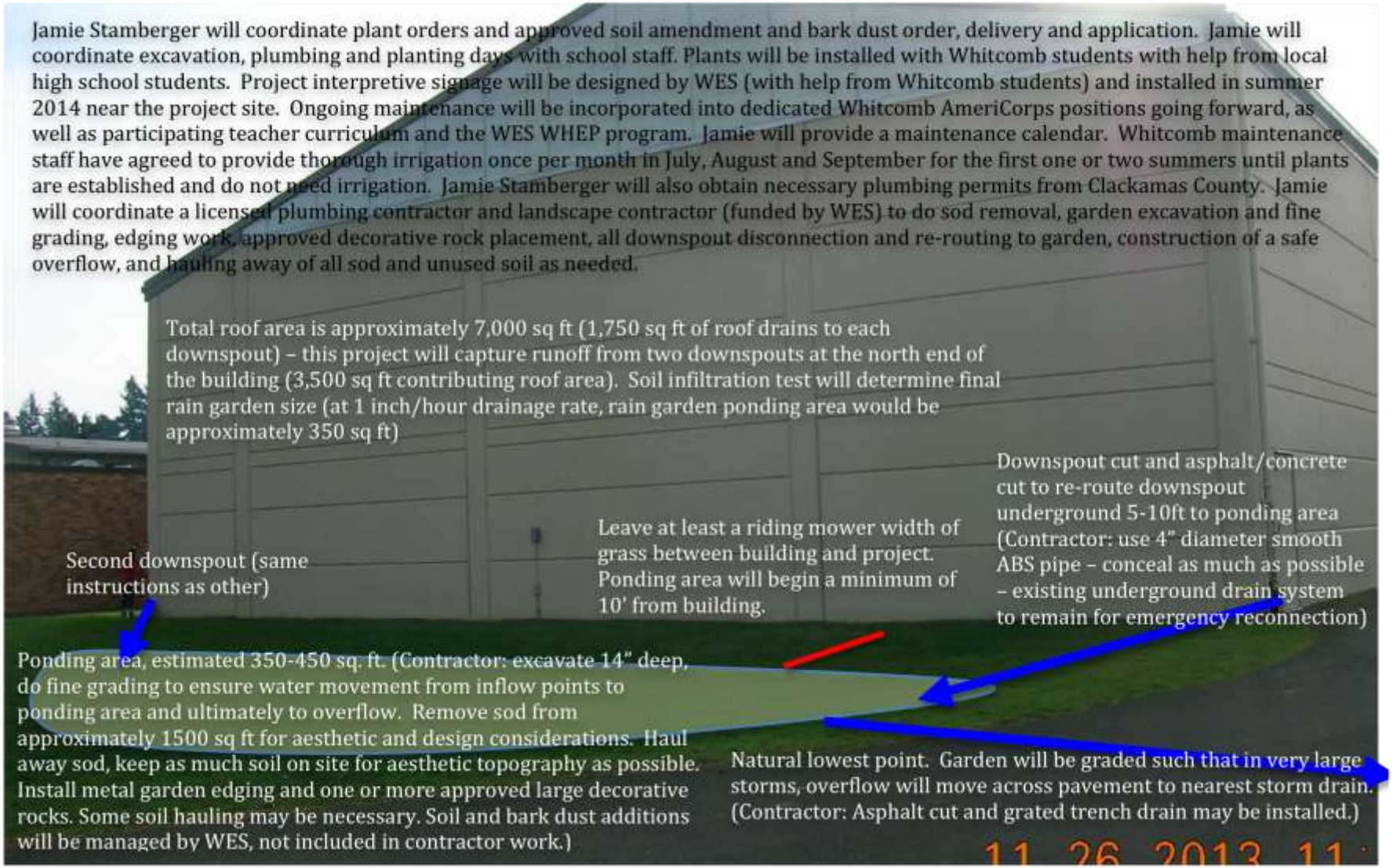
Whitcomb Elementary Rain Garden Plan – Jamie Stamberger, Clackamas Co. Water Environment Services – Jan, 2014



CAPITAL IMPROVEMENT PROJECT APPLICATION FORM

Date: 1/13/2014 School name: Whitcomb Elementary School

Specific area of facility to be affected: Grass area between the north end of the gym and the parking lot.

Project title: Rain garden

Name(s) of applicants(s): Jamie Stamberger (Clackamas Co. Water Environment Services), Cathy Lehmann (Principal)

Daytime phone: Jamie: 503-489-8566, Cathy: (503) 353-5660 Cell phone: Gail Shaloum (WES): 503-742-4597

Email address: jamie@stambergeroutreach.com, lehmannc@nclack.k12.or.us, gshaloum@co.clackamas.or.us

Overall project description (attach drawings): Downspouts from the north end of the gym building will be rerouted to a garden (bowl-shaped flower bed) in the grass area north of the gym. Garden will be planted with approved low-maintenance native plants. Compost, bark dust, approved decorative rock will be included. Interpretive signage installed for education.

Benefits to school and community: Educational resource for students and parents, reduces polluted runoff entering local creeks, provides habitat, will be incorporated into ongoing curriculum, demonstration to encourage rain gardens at homes

Project schedule and responsible party for each phase of the schedule: Final project planning: March/early April
Plumbing permit, hiring of contractors, scheduling work with NCSD and Whitcomb/other schools: March/early April
Excavation and plumbing: early April Planting with students: April/early May Installation of interpretive signage: May/June

Total budget available for project: $10,500 Funding source(s) for budget: WES

Is budget in place for project? (Yes)/No Is budget in place for installation? (Yes)/No

Contingency plan for unanticipated expenses: Consulting budget from Jamie Stamberger available if necessary up to $10,000 additional

Contingency plan for changes in timeline: Project can be delayed until fall 2014 or spring 2015, but no delay is anticipated

Signatures: Principal and applicant must sign verifying agreement with and acknowledgement of the following responsibilities:

- Applicants are responsible for obtaining all necessary funding and support to complete the project.
- Applicants will make reasonable efforts to adhere to the projected schedule.
- Completing this Project Proposal Form is not assurance the project will receive approval.

We agree not to proceed with the project until the pre-project meeting with Facilities is held.

Applicant: Jamie Stamberger (WES Consultant)

Principal: Cathy Lehmann (Whitcomb Principal)

This area for Facilities Department use only

Additional information needed: _____

Approved _____ (initial & date) Approved w/Conditions _____ (initial & date) Rejected _____ (initial & date)

The District reserves the right to cancel, suspend or modify your project if it is in the interest of the District. Any project not completed within one year of the approval date is subject to reapplication for the project approval and possible revised conditions.

Whitcomb Elementary Rain Garden Weeding Guide

Prepared June 2015 by Jamie Stamberger (Jamie@stambergeroutreach.com; 503-489-8566) on behalf of CCSD#1 Water Environment Services (WES). WES contact is Gari Johnson (gjohnson2@co.clackamas.or.us)

Weeding Schedule:
Weeding should be done monthly from April to early July (this may extend earlier or later, depending on the season). Weeding should also be done once or twice September through November. Weeding needs will decrease as desired native plants grow larger. The idea is that the native plants will fill in completely in 3-4 years and leave no room for weeds to grow, effectively reducing weeding needs to almost zero.

Weeding Tips:
Be sure to pull the root out with any weeds, or they are likely to grow back (especially grasses and dandelions). If the soil is very dry, consider watering the day before a weeding party to help loosen the soil and make root removal easier.
Do not add weeds that are flowering or have seeds on them to the compost. The compost at the school does not get hot enough to kill weed seeds. Those seeds will eventually be re-applied with the compost and perpetuate the weed problem.

How to tell which things are weeds and which are desired native plants:
The most common weeds in the rain garden will be dandelions and grass. The grass is migrating in from the lawn around the garden – please pay special attention to grass growing over the edging and into the garden around the edges. There is also a white daisy with a yellow center that has migrated in from the grass. This should be removed if it becomes too aggressive, or the school doesn't like it. In spring 2015 it was not too aggressive, but it may become so (keep an eye on it). Tansy ragwort, a severely invasive weed, may also find its way into the garden and should always be removed, preferably before it makes flowers. Once it has flowers, do not put it in the compost bin! We did not plant any trees in the garden – alder and cottonwood seedlings may start in the garden, but should be pulled out before they get too big. Trees have very deep taproots and can be very hard to remove once they have gotten a foothold. Clover is another common garden weed, which can actually be left alone and be beneficial to the garden if it does not seem to be out-competing desired plants. Clover (and all legumes, plants in the Pea family) has a symbiotic relationship with microbes in the soil that fix nitrogen and help make it available to other plants, effectively helping to fertilize the soil. Clover flowers are also a favorite of our 200 native, mostly non-stinging bee species on which we depend for pollination of our food. So, clover can be left alone as long as it is not outcompeting our desired plants or getting too out of hand. Feel free to remove some and leave some as you like. See the Weeds photo section below for pictures of these common weeds.

Most of the native plants we planted in the rain garden will be easy to tell from weeds because they are larger and shrubbier. However, some of our native plants are easy to mistake for common garden weeds. Please compare plants in the garden to the pictures below of the desired native plants we planted and want to keep. Plants that are most likely to be mistaken for weeds have a red box around them. Slough sedge looks similar to a grass, but will be taller, have wider blades, is evergreen, and feels sharp or sticky to the tough. Oregon iris and Camas lily will be more difficult to discern from grass. Oregon iris blades are also thicker than grass and will only come out of the ground in small clusters – the blades may also feel softer than a grass and come out of the ground in a fan-like shape, coming out of a central point, especially when they are small. They may be lighter green than other grasses. Camas lily is a delicate purple lily that blooms early in the spring. Its leaves will come out earlier than many grasses and will be in a floppy group of three blades. The blades are usually shiny and wider than most grasses. After the lily blooms, the leaves will turn yellow and flop over. Oregon sunshine does not look like a grass, but it can be confused with other weeds. It has whitish looking furry leaves and spreads out along the ground. Richardson's penstemon can also be mistaken for a weed. After it blooms, it creates brown seedpods on stalks 1 foot tall or less that rattle when brushed up against. Penstemon also grows by spreading out along the ground and has small leaves. The seed heads should be left each year – they are great food for birds and will create more penstemons!

Common Weeds:

There are many kinds of clover:

And several types of dandelions, all of which can be removed, although bees also like the flowers:

Tansy ragwort (nasty invasive weed):

Clackamas High School

(Clackamas County Service District #1 Water Environment Services)

- Project of Clackamas Co. Water Environment Services, part of the Watershed Health Education Program
- Rain garden captures runoff from 17,000 sq ft of parking lot, 476,000 gallons of runoff per year
- Rain garden and parking lot swales designed by engineers (Greenworks) and plan drawings created, excavated by other contractors
- Greenworks visited classrooms, students voted for location and type of facility, taken into account in project ranking
- In-classroom lessons and site tours before planting to frame/provide background, stormwater flow calculations
- Three rotating stations on planting day: who am I plant game, planting in rain garden planting on slope
- Engaged over 300 high school students at CHS
- Students designed quotes and artwork used in interpretive sign

EXISTING CONDITIONS AND DEMOLITION LEGEND:

- TREES TO REMAIN - PRESERVE AND PROTECT
- TREES TO BE REMOVED
- EXISTING 5' MAJOR CONTOUR
- EXISTING 1' MINOR CONTOUR
- EXISTING SANITARY SEWER LINE
- EXISTING STORM SEWER LINE
- EXISTING ELECTRICAL CONDUIT - PRESERVE AND PROTECT
- CHAINLINK TEMPORARY CONSTRUCTION FENCING (LIMITS OF WORK)
- CLEAR AND GRUB - SEE SPECIFICATIONS
- EXISTING PAVING, CURB, AND SUBGRADE TO BE REMOVED
- SAWCUT LINE, SEE LAYOUT PLAN AND DETAILS FOR EXTENT OF EXCAVATION
- EROSION CONTROL BIOFILTRATION BAGS - PLACE AROUND CATCH BASINS AND MANHOLES, SEE DETAIL 5/L8.1

EXISTING CONDITIONS KEY NOTES:

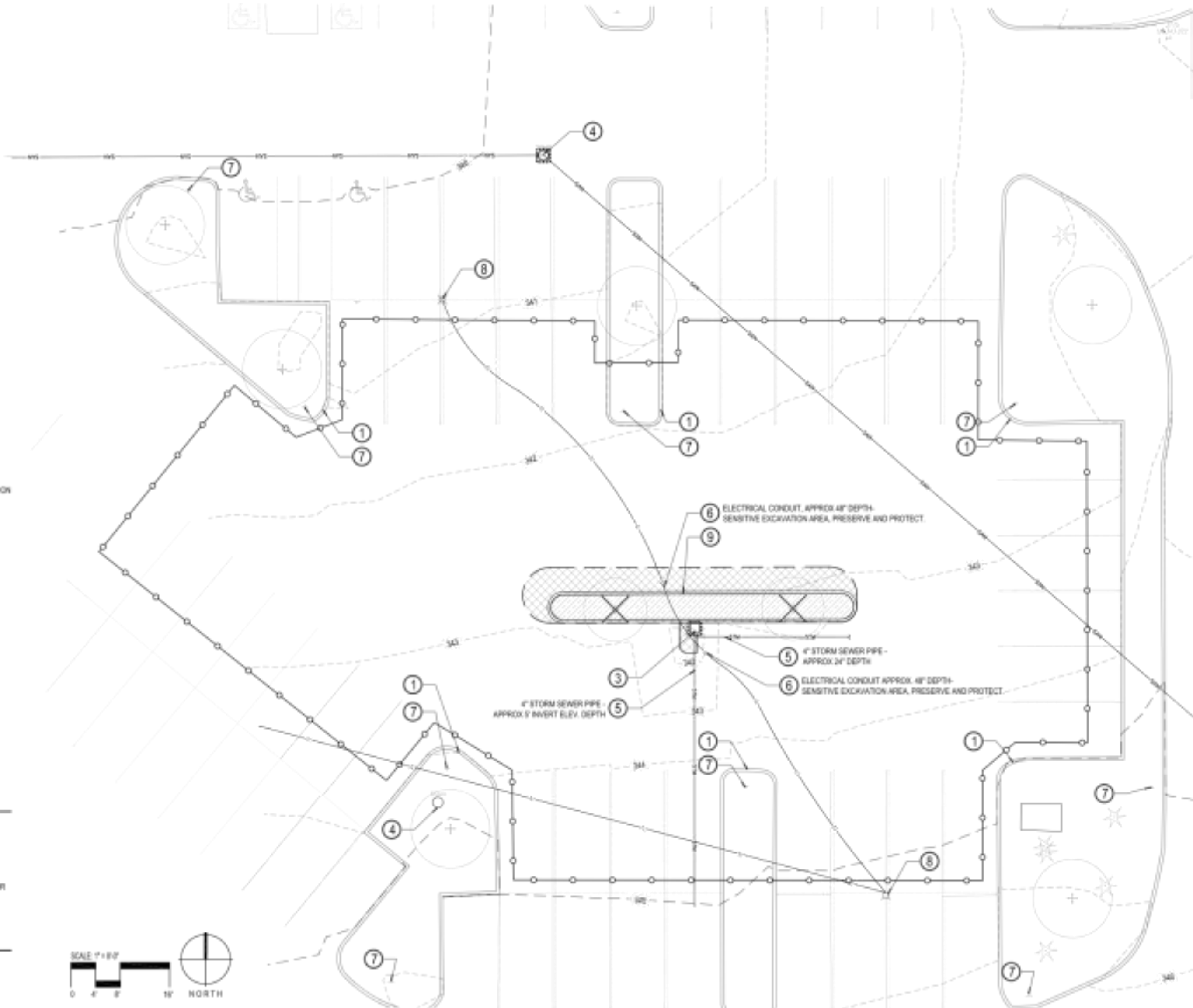
1. EXISTING CURB TO REMAIN - PRESERVE AND PROTECT.
2. EXISTING CATCH BASIN TO REMAIN
3. EXISTING CATCH BASIN TO BE CAPPED
4. EXISTING MANHOLE - PRESERVE AND PROTECT
5. EXISTING STORM SEWER LINE
6. EXISTING ELECTRICAL CONDUIT APPROX. 48" DEPTH - PROTECT AND PRESERVE
7. EXISTING SIGN - PRESERVE AND PROTECT
8. EXISTING LIGHT POLE - PRESERVE AND PROTECT
9. EXISTING CURB TO BE REMOVED

NOTES

1. PLACE INLET PROTECTION PRIOR TO ANY SITE DEMOLITION AND REMOVE AT THE CONCLUSION OF ALL OTHER CONSTRUCTION ACTIVITIES.
2. SEE PLANS AND DETAILS FOR EXCAVATION DEPTHS.
3. INLET PROTECTION TO BE PROVIDED AS SHOWN IN PARKING LOT FOR CATCH BASINS AND MANHOLES, PER CLACKAMAS COUNTY STANDARDS.

SURVEY INFORMATION

RON BUSH SURVEY
ELEVATION IS BASED ON A 3-HOUR STATIC GPS SECESSION
VERTICAL DATUM IS NAVD 88
HORIZONTAL DATUM IS A LOCAL DATUM WITH BENCHMARK # 1
BEING HELD AT N=20,000, E=20,000, ELEV=346.55



GREENWORKS
GreenWorks, P.C.
Landscape Architecture
Environmental Design

Educational Institution
Clackamas High School

project: **Clackamas High School LID Retrofit**
Water Environment Services

submittal: PERMIT PLANS

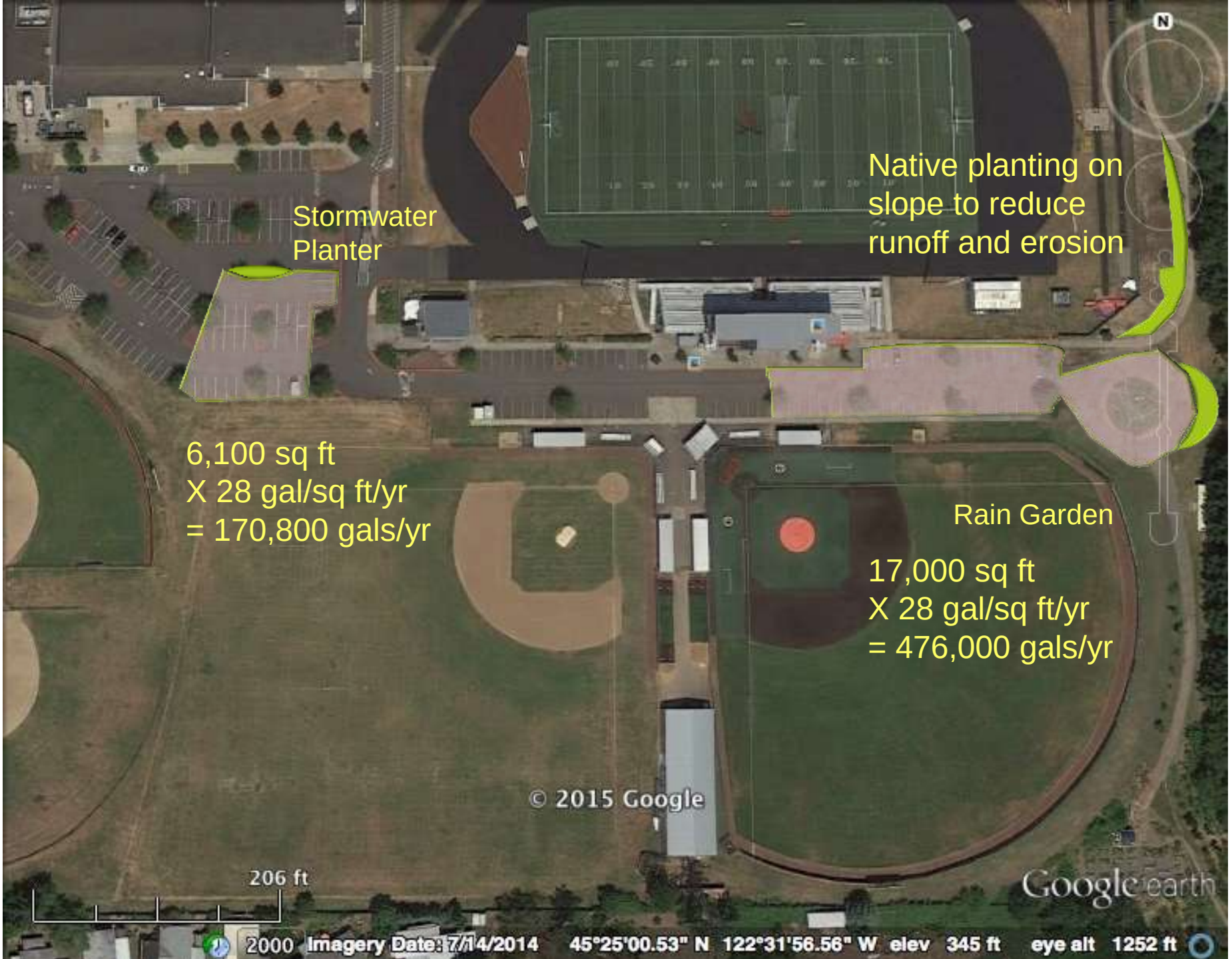
sheet title: **EXISTING CONDITIONS AND DEMOLITION PLAN**

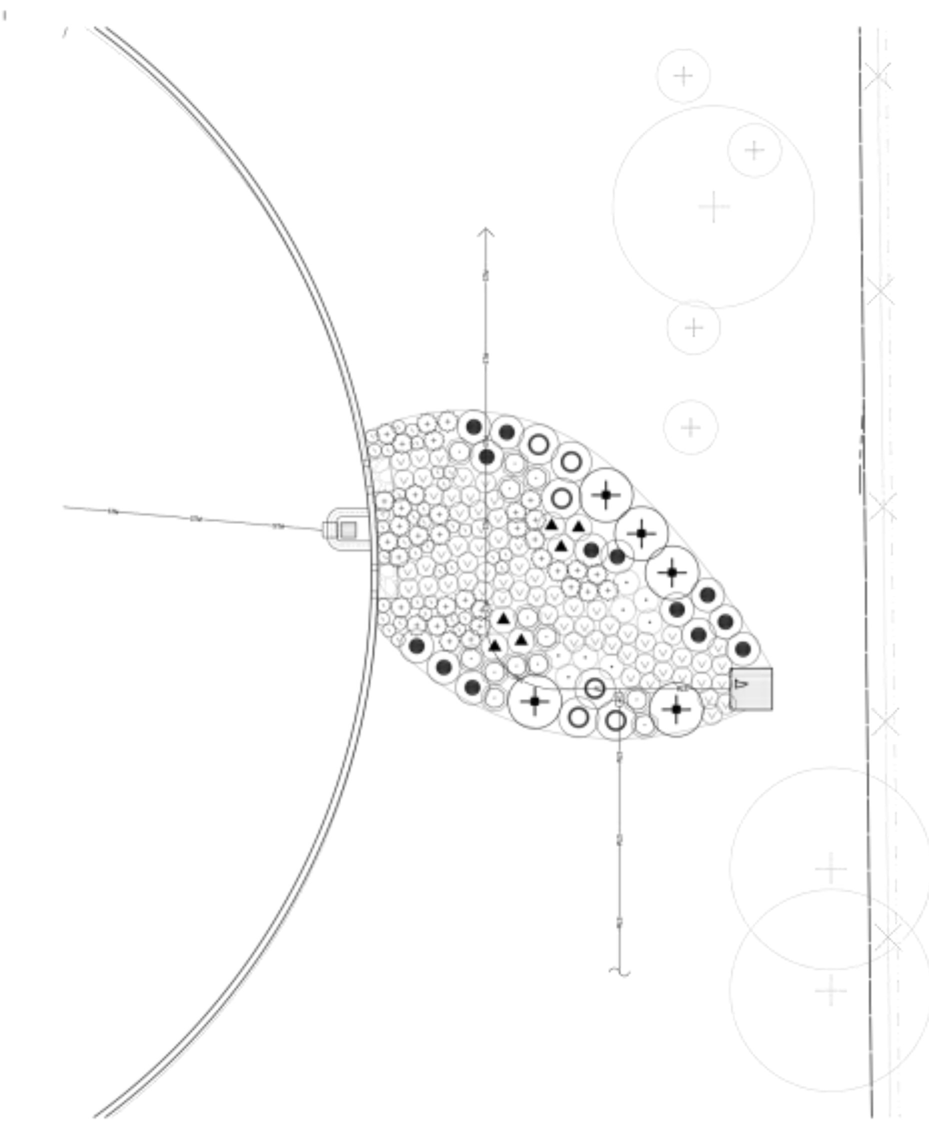
Date: 1/27/2016
Revisions:

Drawn By: DS
Checked By: DW
Job No. 113343.1
Approved: MF

L1.0
sheet no. 3 of 14


TRANSPORT
A Always use complete sentences
C Capitalize correctly
E End punctuation matters
S Spelling counts
Please turn them off and put them away.
Typical Types of LID Projects
Roofs
Green Roofs
Downspout Disconnect to Rain Garden
Artistic Downspout
Clackamas High School Potential Projects
GREEN WORKS


Native planting on slope to reduce runoff and erosion
Stormwater Planter
6,100 sq ft
X 28 gal/sq ft/yr
= 170,800 gals/yr
Rain Garden
17,000 sq ft
X 28 gal/sq ft/yr
= 476,000 gals/yr
© 2015 Google
206 ft
Google earth
2000
Imagery Date: 7/14/2014
45°25'00.53" N 122°31'56.56" W elev 345 ft
eye alt 1252 ft



EXISTING TREE LEGEND

EXISTING TREE TO REMAIN
PRESERVE AND PROTECT

PLANTING NOTES

1. CONTRACTOR SHALL PROVIDE AND PLACE PLANTING SOIL.
2. CONTRACTOR TO SEED ALL DISTURBED GRASS AREAS OUTSIDE RAIN GARDEN PERIMETER WITH SPECIFIED LAWN SEED MIX.
3. ALL DISTURBED AREAS SHALL BE SMOOTH GRADED AND APPROVED BY OWNER'S REPRESENTATIVE.

PLANTING LEGEND - NIC (BY STUDNETS)

SHRUBS AND GRASSES - NIC (BY STUDENTS) — 5/L6.2, 6/L6.2, 7/L6.2

QTY	
	CAMASSIA QUAMASH
37	CAMAS LILY; SPACE AS SHOWN; 1 GAL. CONT.
	CORNUS SERICEA 'KELSEY'
13	KELSEY DOGWOOD; SPACE AS SHOWN; 2 GAL. CONT.
	SPIREA DOUGLASII
5	DOUGLAS SPIRAEA; SPACE AS SHOWN; 2 GAL. CONT.
	ELYMUS GLAUCUS
64	BLUE WILD RYE; SPACE AS SHOWN; 1 GAL. CONT.
	MAHONIA AQUIFOLIUM
6	OREGON GRAPE; SPACE AS SHOWN; 2 GAL. CONT.
	MAHONIA NERVOSA
6	DULL OREGON GRAPE; SPACE AS SHOWN; 2 GAL. CONT.
	POLYSTICHUM MUNITUM
8	SWORD FERN; SPACE AS SHOWN; 2 GAL. CONT.
	SCIRPUS MICROCARPUS
35	SMALL FRUITED BULLRUSH; SPACE AS SHOWN; 1 GAL. CONT.
	SPIRAEA BETULIFOLIA
13	BIRCHLEAF SPIRAEA; SPACE AS SHOWN; 2 GAL. CONT.

PLANTING NOTES - NIC (BY STUDNETS)

1. ALL PLANTS AND MULCH SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS PROVIDED AS PART OF THE CONSTRUCTION DOCUMENT PACKAGE.
2. QUANTITIES ARE LISTED FOR CONVENIENCE ONLY. ALL COUNTS MUST BE VERIFIED. IN THE CASE OF A DISCREPANCY BETWEEN THE LEGEND AND THE PLAN, PLANTS INDICATED ON THE PLAN SHALL SUPERCEDE QUANTITIES LISTED IN THE LEGEND.

NORTH

GREENWORKS
GreenWorks, P.C.
Landscape Architecture
Environmental Design

Educational Institution
Clackamas High School

REGISTERED LANDSCAPE ARCHITECT — OREGON

project: **Clackamas High School LID Retrofit**
Water Environment Services

submittal: PERMIT PLANS
sheet title: **PLANTING PLAN RAIN GARDEN**

Date: 1/27/2015
Revisions:

Drawn By: DS
Checked By: DW
Job No. 113343.1
Approved: MF

L5.1
sheet no. 11 of 14

Clackamas High School Erosion and Runoff Reduction Project – slope east of football field

This project will help reduce overland runoff and erosion onto sidewalk from football field. Resources are available to complete this phase of the project. Pending resources, this project may be expanded in future school years to include continued education and planting and bark dust of entire slope. A landscape contractor will conduct excavation work and rock/gravel placement. Planting and bark dust addition to be done by high school students as part of educational activities. "Hog Fuel" bark dust, a specialty bark dust for sticking to steep slopes, will be used.

Project location at CHS behind football field.

Total project area: ~3,000 sq ft

Total planting area: ~2,500 sq ft

Total shallow excavation area: ~600 sq ft

Slough sedge, *Carex obnupta*

To 3' tall, evergreen, help absorb water, for around drainpipe outfall

Spreading rush, *Juncus patens*

To 3' tall, evergreen, help absorb water, for around drainpipe outfall

Kinnikinnick, *Arctostaphylos uva-ursi*

Low-growing evergreen groundcover, to 5 in. tall, fills in to 5 ft wide, reduces erosion, drought tolerant to cover ground and fill in along slope

Coast strawberry, *Fragaria chiloensis*

Low-growing evergreen groundcover, to 5 in. tall, fills in to 5 ft wide, reduces erosion, drought tolerant, to cover ground and fill in along slope

Birch-leaved spirea, *Spiraea betulifolia*

Deciduous shrub, 3 ft tall by 2 ft wide, for near drainpipe outfall and in several groups along slope, also in caul de sac rain garden

Oregon iris, *Iris tenax*

Flowering perennial to 12 inches tall, to be planted in groups along slope for color


COMBAT
MODE
CAVS


NIKE


FIRE LANE

Name: Bethany Cleon Date: 4/17/15 Period: 8 Teacher: Grange

WATERSHED HEALTH EDUCATION PROGRAM SPRING 2015: CHS RAIN GARDEN EDUCATIONAL SIGN

Clackamas County Water Environment Services (WES) will be selecting 1-2 student quotes or drawings t include in the educational sign that will be installed at this rain garden. Please think about and write in quote and/or draw a picture, or both. Include your name, etc. so that we can find your work is selected.

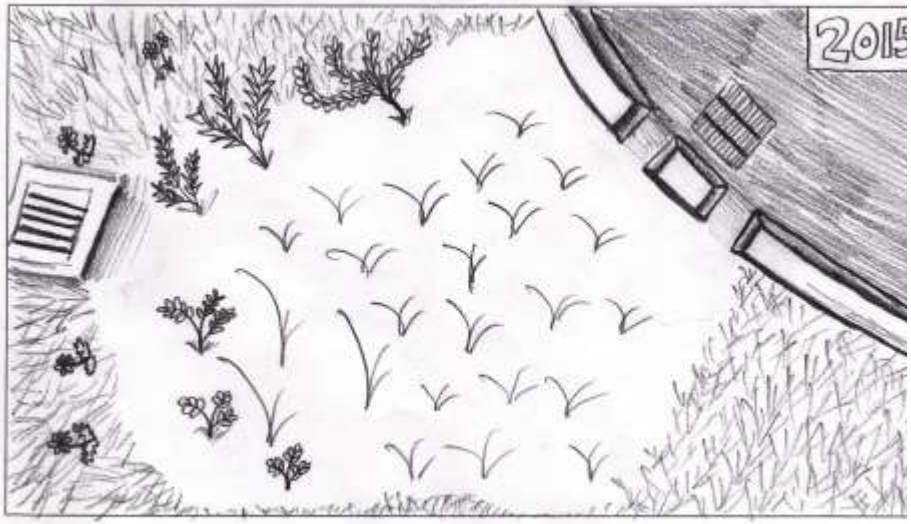
You will have 15 minutes to get your ideas on paper.

Ideas for quotes: how you feel about the rain garden, being a part of this experience, how you think it helps the environment, the community, and students at your school, why this rain garden is important to you, etc.
Ideas for drawings: a picture of how pollution and runoff affects local rivers, examples of pollution themselves (yo can include a storm drain), a picture of a healthy river, a drawing of the rain garden

Quote:

Making a rain garden has really made me feel like I made an impact, and that a part of me and my classmates will always be part of the rain garden. We left a piece of us in that rain garden. And hopefully, that piece will help influence the future CHS students in a positive way.

Drawing:



Name: Reanna Le Date: 4/17 Period: 8 Teacher: Grange

WATERSHED HEALTH EDUCATION PROGRAM SPRING 2015: CHS RAIN GARDEN EDUCATIONAL SIGN

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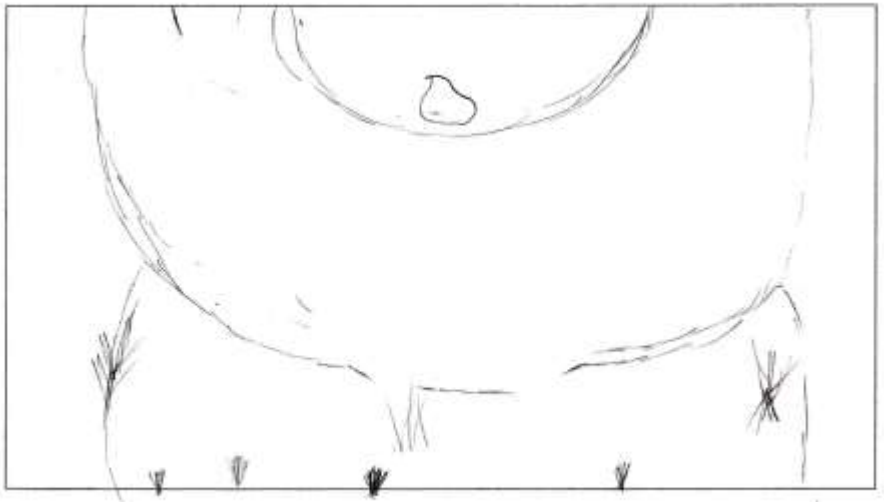
Ideas for drawings: a picture of how pollution and runoff affects local rivers, examples of pollution themselves (you can include a storm drain), a picture of a healthy river, a drawing of the rain garden

Quote:

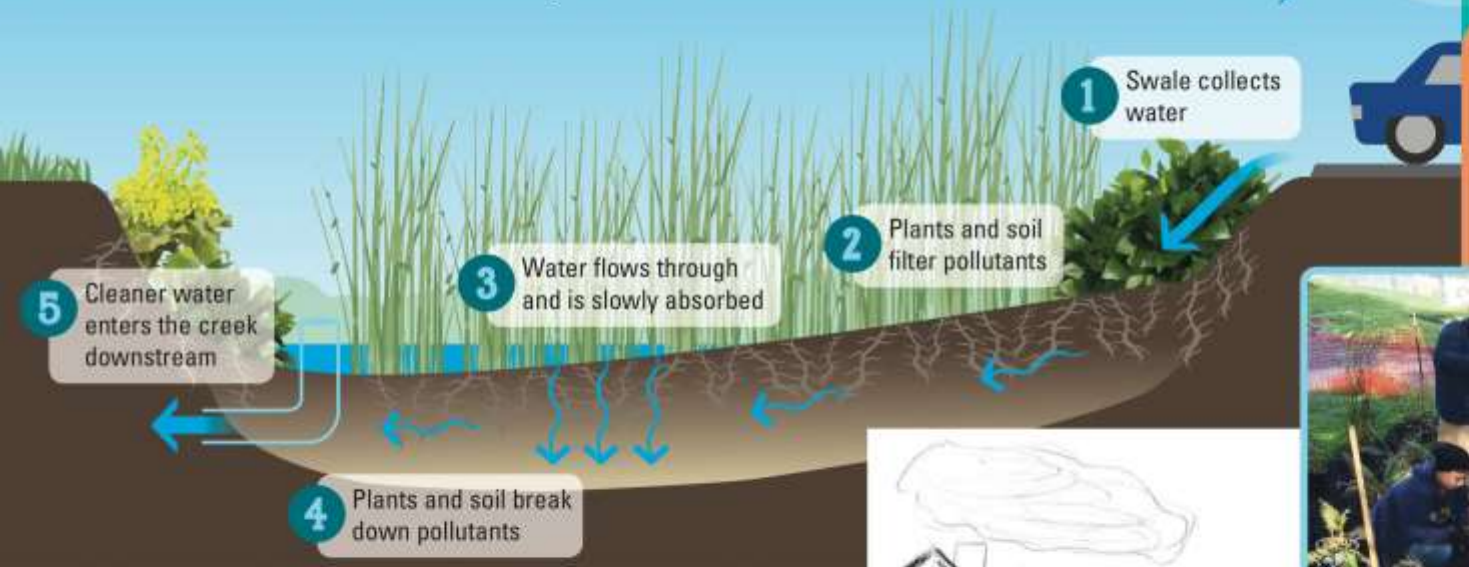
I'd say that this experience was very fun and educational. It was fun to help the community around our school. We learned things about our school that I've never known about for. I had a fun time working with WES on the Rain Garden and Native Habitat hill project.

Drawing:



HOW DOES THIS SWALE CLEAN OUR WATER?

A swale is a long open channel that carries, slows and absorbs stormwater and filters out pollutants. When it rains, the water hits this parking lot and flows into the swale, picking up whatever is on the ground along the way. As the runoff flows along the length of the swale, the vegetation slows and filters it and allows it to soak into the ground.



"PREVENTING FUTURE POLLUTION, ONE RAIN GARDEN AT A TIME."

–HAYDEN DESMET

"Previniendo la contaminación un jardín de lluvia a la ves"

This swale also contains beautiful native plants that provide habitat and food for native insects and birds. Students at this school installed the plants as part of the Watershed Health Education Program.

EL CANAL DE DRENAJE

Es un canal abierto largo que lleva, se desacelera y absorbe agua de lluvia y filtra los contaminantes. Cuando llueve, el agua cae en este estacionamiento y derrama en el canal de drenaje, recogiendo lo que está en el suelo de camino. Mientras los vertidos se derraman sobre el canal de drenaje, la vegetación refrena y filtra el agua que permite ser absorbido en el suelo.

Water Environment Services

North Clackamas Schools
engaged. inspired. ready.

Gresham High School (City of Gresham, East Multnomah Soil and Water Conservation District)

- Grant funded by East Multnomah Soil and Water Conservation District, implemented by City of Gresham
- Captures 28,000 gallons of runoff per year from 1,000 sf roof
- Rain garden team: Principal, botany teacher, head custodian
- Design by HS botany classes, competition
- Excavated by City of Gresham Operations Dept.
- Plumbing approved by building dept, internal engineers drawing, formal approval by School District process
- Maintained as part of ongoing botany curriculum
- Rotating stations included planting and stormwater scavenger hunt


Locate


KOMATSU
PC
45


KOMATSU


KOMATSU


All water has a
perfect memory &
is forever
trying

RAIN GARDENS:

STORMWATER POLLUTION OCCURS DAILY

As rain hits our streets, lawns and homes, it collects any pesticides, fertilizers, gasoline, litter, brake dust, oil and pet waste it encounters and ultimately dumps this "chemical soup" into our streams. There is no treatment system to remove any of the pollutants. That's where rain gardens come in – they mimic natural systems that filter out pollutants and clean our water.

SLOWER WATER, FEWER PROBLEMS

Keeping stormwater on-site reduces the amount of water that pours into streams during storms that cause prolonged muddy water that is bad for fish as well as flooding and erosion that damage property.

BUILD YOUR OWN RAIN GARDEN!

A homeowner's guidebook with instructions is available at the City's Web site GreshamOregon.gov/watershed or by calling 503-618-2657.

This guide will help you size your garden to ensure that it works properly.

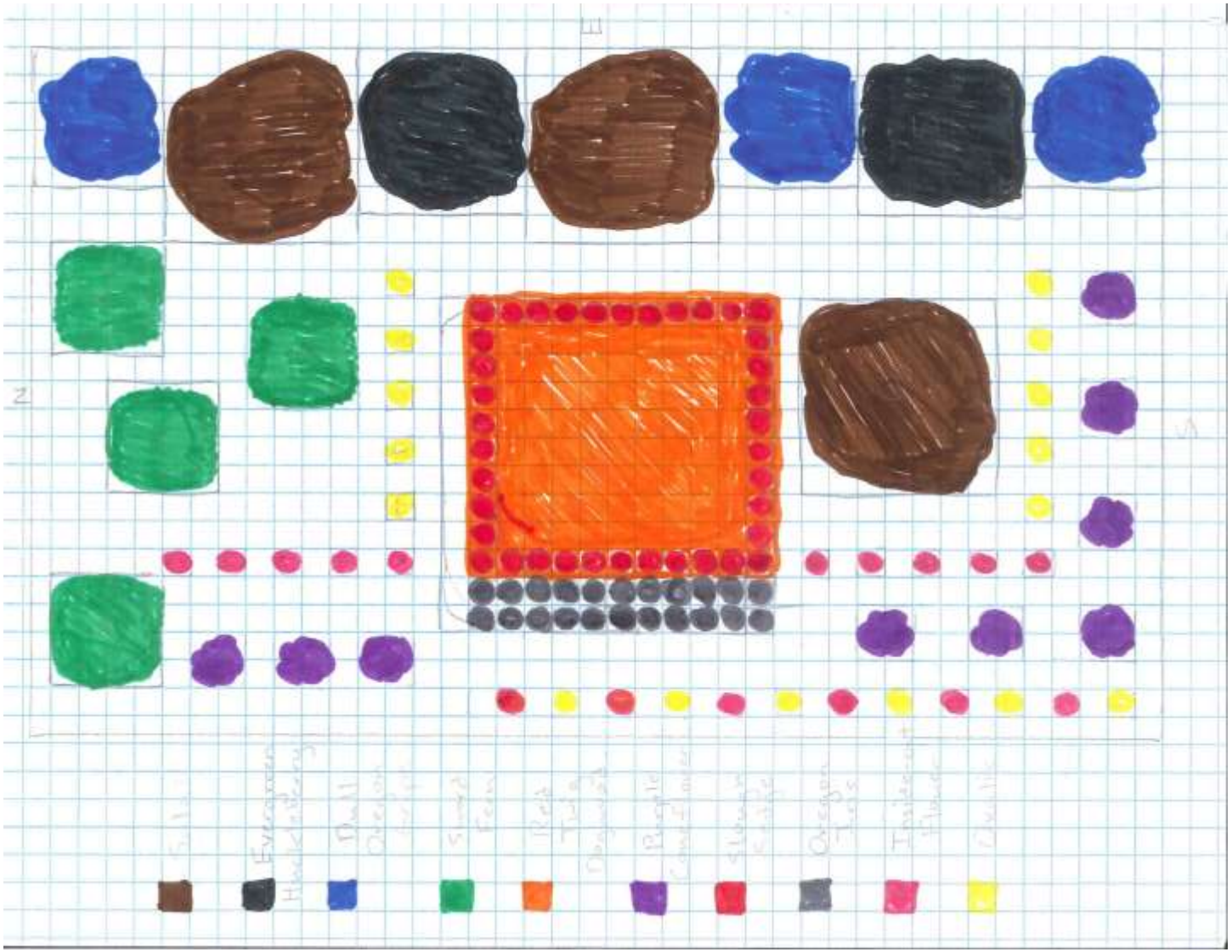
HARDWORKING BEAUTY

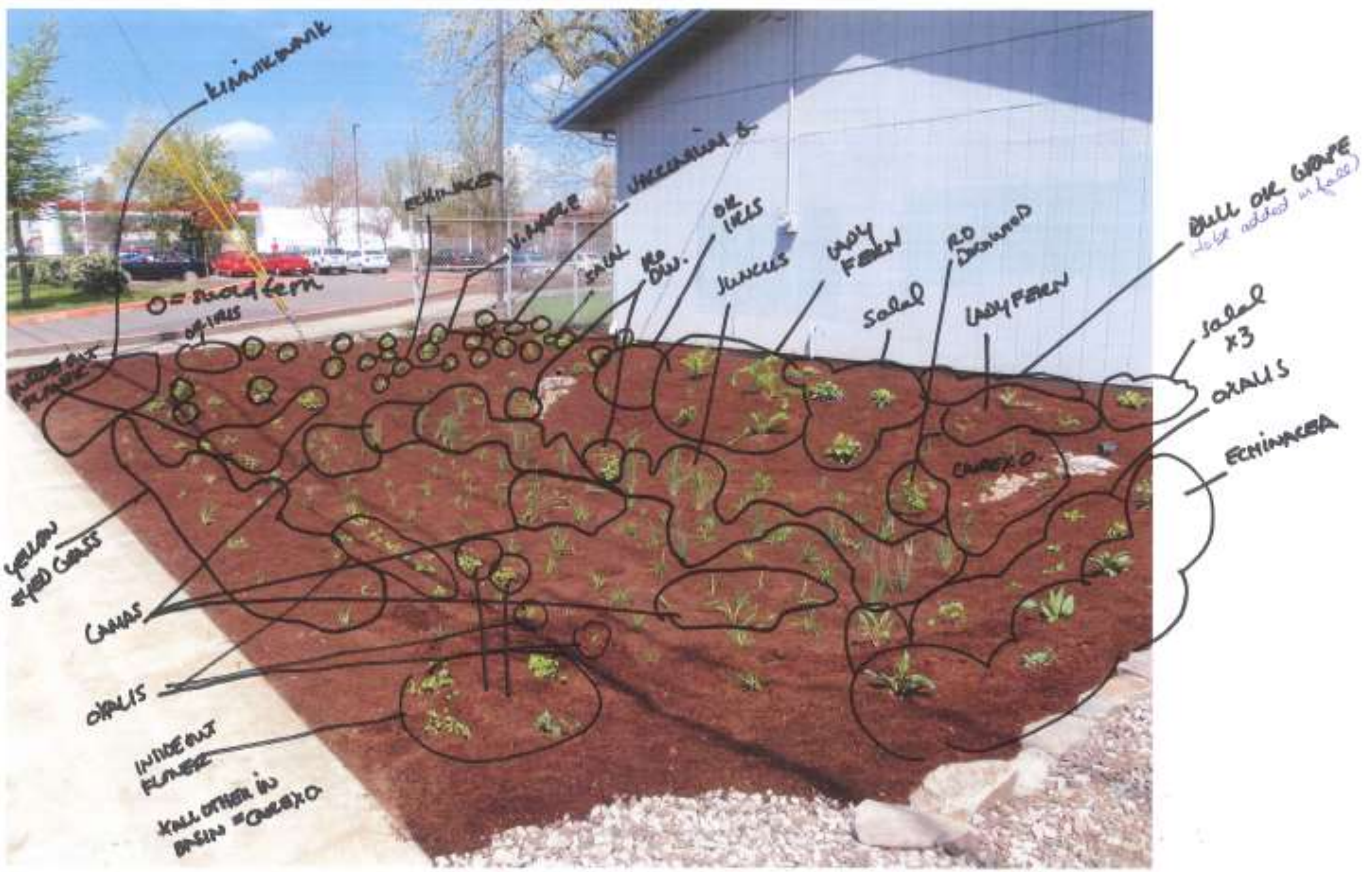
HOW DOES THIS RAIN GARDEN WORK?

Rain is directed into this bowl-shaped garden that treats stormwater by filtering it through the plants and soil. This waters the plants, removes pollutants and recharges the water table.

The native plants featured here were selected for their beauty and their tolerance of both drought and standing water. These characteristics work in concert to make the rain garden an attractive and extremely low-maintenance feature that is designed to hold water for a day or two, preventing mosquitoes from breeding.

Sedges and rushes like these used in this garden are prized in stormwater treatment facilities for their ability to absorb and remove common pollutants such as heavy metals, oils and grease.





O = sword fern
OR IRIS
ECHINACEA
V. MAPLE
SALAL
RO DW.
OR IRIS
JUNCUS
LADY FERN
RO DOGWOOD
Salal
LADY FERN
BULL OR GRAPE
Salal X3
OXALIS
ECHINACEA
CAREX O.
YELLOW EYED GRASS
CAMAS
OXALIS
INSIDE OUT FLOWER
XALL OTHER IN BASIN = CAREX O.


Gravel will be scraped off and hauled away, spoils from excavation will be used to create topography, area around rain garden will be landscaped with native plants.
1000 sf of roof will be redirected to rain garden
Overflow from very large storm events will drain to existing storm drain through landscaping
Downspouts will be disconnected from existing buried drain system and redirected to rain garden via 3" diameter ABS pipe. Water will enter rain garden 10 ft from foundation of building.

City of Gresham Demonstration Garden Maintenance Agreement

I/we, the at Gresham High School (facility name), have partnered with the City of Gresham to construct and maintain a stormwater management /natural gardening/wildlife habitat demonstration garden. Under this partnership, described in detail below, the city will construct and plant a demonstration garden at no cost in exchange for regular maintenance of the garden in perpetuity.

Under this partnership,

The City of Gresham will:

- Conduct a soil percolation test to ensure proper soil drainage, if necessary
- Design the garden and review design with interested parties
- Excavate and shape the garden according to design specifications
- Amend soil with organic material to improve drainage, if necessary
- Install low maintenance native plants, mulch and weed barrier fabric where necessary
- Install a rainwater harvesting system and/or eco-roof demonstration if applicable to the project
- Install interpretive signage near the garden
- Offer guidance related to maintenance, including hands-on training, if necessary

School Staff will either conduct or ensure completion of the following maintenance activities:

- Manually remove weeds from demonstration garden three times per year, or as needed
- Water new native plantings deeply once per month for *only the first two* (2) *summers* after planting (late June to late September). After two summers, the plants will be drought tolerant and will not need summer water. *Additional watering may be necessary during periods of extreme heat or if plants are visibly drought stressed. Watering in early morning is encouraged.
- Abstain from using fertilizers or pesticides on or near the garden
  *Pollutants in stormwater facilities can end up in our streams and/or the ground water table
- Check for pet waste in the garden weekly if dogs/cats are in the area, and remove as necessary
  *Bacteria from pet waste is a serious water quality problem in Gresham streams
- Contact affiliated city staff with any questions or concerns to gain approval *before* relocating, damaging, removing or otherwise killing any native plantings
- Contact affiliated city staff to report natural plant death *The city will pay to replace plants that have died naturally for up to one year, so long as the problem is not deemed to be attributed to poor maintenance practices.

I certify that I have read, understand and agree with the terms of this partnership as described above. I understand that this garden will be an amenity to the community and will demonstrate low-maintenance, environmentally friendly home landscaping that will improve water quality and wildlife habitat in Gresham. As the school staff, we understand that although the city is able to provide technical assistance and training, we are ultimately responsible for the maintenance of this demonstration garden outside of the city's limited responsibilities as described above.

(Signature) _____ (Date) 1/31/11

(Signature) _____ (Date) 2/4/11

(Signature) _____ (Date) 2/16/11

Gresham High School Rain Garden Suggested Yearly Maintenance Schedule

Call Jamie Stamberger or Keri Handaly at the City of Gresham with any questions or concerns.
Jamie: 503-618-2793; Keri: 503-618-2657

Lawn and garden chemicals run off into our local rivers during winter rains and cause water pollution, while excessive watering uses up precious resources. Native plants are naturally tolerant of drought and don't need summer watering, and are adapted to local soils and pests, eliminating the need for fertilizers and pesticides. This makes for a very low-maintenance garden, and a healthier environment! Native plants also provide food, shelter and nesting places for local wildlife – be on the look-out for birds, bees, and butterflies!

Special Notes: The end of the gutter on the south west corner of the shop is destroyed and should be replaced in order for the rain garden to function properly. Currently, runoff from that downspout is not being directed to the ABS pipe, but is instead falling out of the gutter and causing a rivulet in the bark dust and soil in that corner of the rain garden. Jamie emailed Terry Taylor of GBSD about this concern in May, 2011.

Spring (March – June)

- Pull weeds in early to mid-April (or as needed to your liking from March through June)
- Add bark-dust as needed to keep soil moisture in and weeds down, or just to dress up the garden a bit (shouldn't be needed every year)
    - Allwood Recyclers on Marine Dr. in Troutdale, or at Boring Bark in Boring, or a number of other metro-area locations – the City can provide a limited amount of bark-dust, let us know
    - We usually use the finely shredded Hemlock or Fir bark (finely shredded has fewer pokeys and stays put better through the rain)
    - Wear gloves when applying mulch!
- Weed fabric covers the entire project, except for the basin of the rain garden – weeds should not be too much of a problem where weed fabric exists
    - Do not line the basin with weed fabric, as this will inhibit infiltration of water in the garden.
    - If you replace weed fabric, overlap layers by a few inches and staple down tightly with long landscape staples – let us know if you need assistance

Summer (July – September)

- Weeding might be needed in early July, but as the weather dries out, weeds grow less vigorously. No weeding should be needed late July – October.
- Water in the first two summers only – then plants will be drought-tolerant and will not need to be watered again, except in periods of more extreme drought.
    - For the first two summers:
        - Fill the rain garden once per month in July, August and September, and water surrounding plants very deeply at the same time.
        - Water in the early morning or evening to avoid sun-burning the leaves.
        - Let us know if there is an issue with watering, and we will try to fill in.
- Can prune back anything dried up and messy-looking, although consider leaving dried flower heads to the birds to eat.
- May have some pest problems in summer – most pests can be left alone if you're not inclined to mess with them. Identify the pest first and determine if it is a real threat to plant health, or if the problem is just too unsightly to be allowed to remain.
    - See your purple and white Natural Gardening Handbook for pest-specific treatments.

Water Quality Scavenger Hunt

Names: Lorraine, Lauren, Marina, Savan

Glossary Terms:

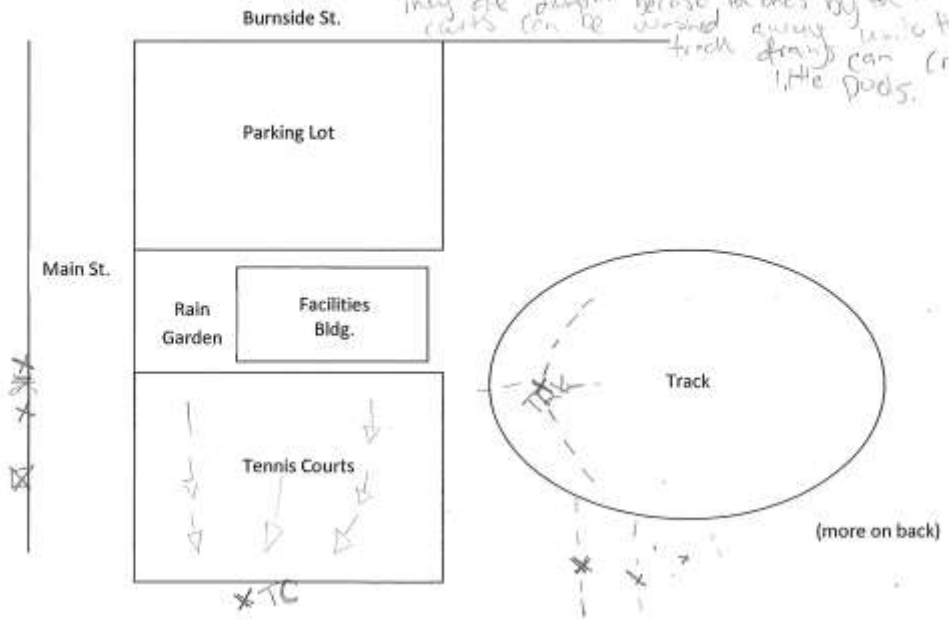
Impervious surface – any surface that is will not let water through and generates runoff when it rains. Examples include rooftops, parking lots, roads, cars and sidewalks.

Storm drain – the drains in the street, parking lots, etc. that collect storm water runoff from impervious surfaces and carry it through the storm pipes underground, often ending in the nearest creek.

Non-point source pollutant – a pollutant that gets to a water body indirectly by rain, wind etc. (for example: dog waste and lawn fertilizer wash into streams with storm water runoff). Point-source pollutants have a direct outfall point, a pipe that dumps them into the water directly.

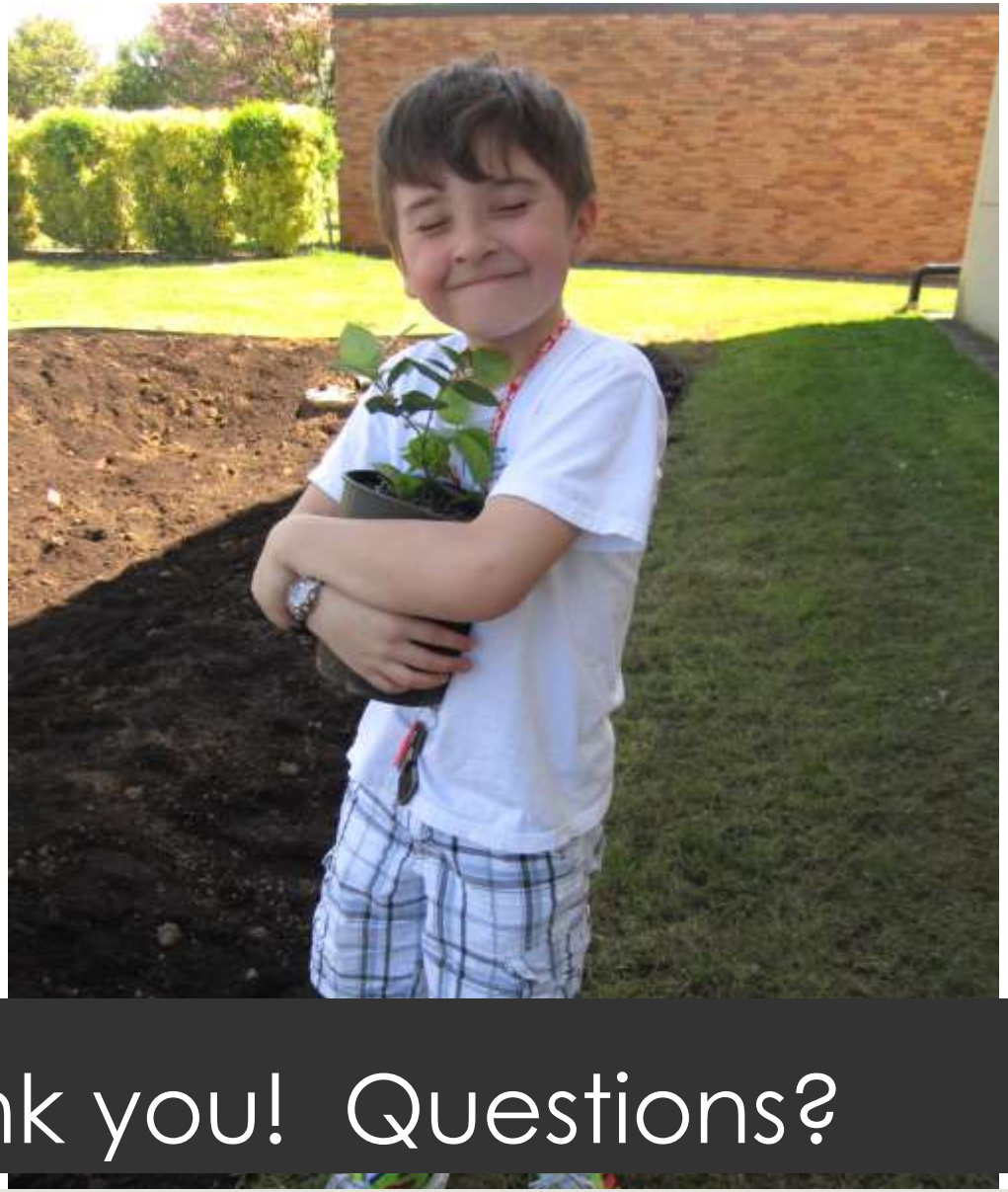
1. **In the diagram below:**
   a) With an "X", label the storm drains on only the east side of Main Street between the tennis courts and Burnside .
   b) Use a dashed line to show the path runoff takes from the track – label the storm drain the track ultimately drains to with a "Trk".
   c) Use arrows to show the path runoff takes from the tennis courts – label the storm drain the tennis courts ultimately drain to with a "TC".
   d) How are the two drainage paths different? Is one better than the other for removing pollutants?

They are different because the tennis courts can be washed away while the track drains can create ponds.



(more on back)


OREGON
STATE



Thank you! Questions?

Jamie Stamberger - StambergerOutreach.com

503-489-8566, Jamie@Stamberger Outreach.com