

## APPENDIX D: DESIGN RECOMMENDATIONS BY SUB-REACH

Specific design recommendations are summarized below by stream and sub-reach. Named streams are listed from large to small, and unnamed tributaries are listed from upstream to downstream along the indicated named streams. All sub-reaches are organized in an upstream to downstream direction along the indicated stream or drainage. Sub-reach locations are shown in Figure 1 and sub-reach data are given in Table 1, at the end of this Appendix.

### NAMED STREAMS

#### **Yreka Creek:**

##### Westside Road Sub-reach:

- Creek channel/floodplain geomorphology is largely intact
- Focus efforts on riparian re-vegetation and long-term conservation
- SGPGA suggests inclusion of a portion of oak woodland on SE side of creek
- Consider trail along NW side of creek from Westside Road to Laura Lane (in previous MP)
- Route trail over Westside Road since bridge undercrossing is too low
- Westside Bridge and Road are low enough to allow large floods to pass over top

##### Yreka Junction Sub-reach:

- Include side channels and bottomland beaver habitat
- Restore area where springs enter creek
- Include bioswales and retention basins at parking drain outlets
- Repair and clean out partially buried outlets
- Include bioswale and retention basin along south side of Moonlit Oaks
- Re-route drainage between Westside Road and Walmart as bioswale
- Include parking behind Raleys with secondary trail loop along creek
- Also include Westside Road trailhead parking
- Use Moonlit Oaks route to connect with Fairgrounds in lieu of box culverts under I-5
- Include spur trails to several portions of shopping center and Comfort Inn/McDonald's
- Consider lighting in box culverts for fish passage (recessed areas for lights already present)
- Resolve feral cat problem, including removal of feeding stations
- Open up riparian vegetation to discourage transient use, and actively patrol after trails built
- Acquire undeveloped Raleys and Richter parcels
- Approach Newton for spoils disposal, creating raised building pads (as along Oberlin Road)

##### Fairgrounds Sub-reach:

- Include County land south of Fairgrounds
- Increase Juniper Creek flood passage at road to private residence behind Fairgrounds
- Increase Yreka Creek flood passage and accommodate trail under Sharps Road
- Install new crossing E of trailer park along Sharps Road to improve drainage from Fairgrounds
- Increase flood passage at 2 Fairgrounds bridges and Armory bridge (unless abandoned)
- Re-route portions of creek channel to restore meanders
- Encourage/assist in acquisition of Armory by Fairgrounds and remove Armory road and bridge
- Relocate 1-3 out-buildings near confluence of Yreka and Juniper Creeks
- Work with Fairgrounds on idea of consolidating barns into single new building further from creek
- Explore feasibility/routes for bypass around east side of Fairgrounds
- Explore feasibility of wider floodplain along Yreka Creek in lieu of bypass
- Retain/improve carnival lawn area, and consider lowering it to provide additional floodway
- Explore feasibility of potential Juniper Creek overflow through N end of CDF to Yreka Creek
- Achieve goal of removing developed portion of Fairgrounds from 100-year flood zone
- Coordinate Sharps Road improvements with proposed trail along N side of Sharps Road
- Consider trail route along eastside of Fairgrounds, Hibbard Field, and Juvenile Facility
- Resolve liability concerns regarding trails
- Include trailhead parking area near corner of Sharps Road and Fairlane Road

Restore portion of creek corridor between I-5 and Fairlane Road, including sediment removal  
Open up riparian vegetation to discourage transient use, and actively patrol after trails built

Sharps Basin Sub-reach (= FHR South Reach):

Acquire wider than normal width to reduce flood hazards resulting from low channel gradient  
Use portions of Moody and Johnson parcels for spoils disposal/future development pads  
Provide road access to portion of Moody property to be used for future development  
Include side channels and bottomland beaver habitat  
Re-route portions of creek channel to restore meanders  
Relocate building on City property on Davis Road to achieve wider floodplain  
Include secondary trails along old RR ROW, along Sharps Road, and tie-in to Davis Road

Schoonmaker Sub-reach:

Relocate existing small building and widen floodplain on east side of creek  
Need room on east side to increase flood passage under Oberlin Road  
Also include overflow channel or bypass on east side of Schoonmaker Trust property  
Widen existing drainage channel between Schoonmaker and railroad  
These changes needed to remove developed portions of site from 100-year flood zone  
Obtain control of RR ROW via Rails-to-Trails (Oberlin Road to Montague)  
Use RR ROW for trail route, and for spoils from this and other sub-reaches  
Move RR alignment to base of hill and further lower/widen floodplain along RR route

Oberlin-Young Sub-reach:

Floodplain lowering/widening and trail improvements to be completed in 2016  
Resolve 100-year flooding north along east side of I-5 to Foothill Drive by raising high point  
Improve routing and tie-in of drainage from this area to inlet at Foothill  
Pursue future funding for sound wall along I-5

KNF Service Center Sub-reach (= FHR Central Reach):

This sub-reach at design stage now and scheduled for floodplain widening/lowering in 2018  
Most buildings, much of storage area, and all retaining walls on east side of creek to be removed  
Much smaller storage area on east side to be retained for storage  
Bridge to storage area to be replaced/enlarged, and road access to be tied-in to County  
Portion of west side of creek to be modified for flood passage but otherwise kept in use  
Project will remove west side developed area from 100-year flood zone  
Project will also include creek channel re-routes to restore meanders  
Project will also include shortening I-5 drainage culverts and installing vegetated bioswales  
Project will also include grading of trail route as part of floodplain widening/lowering  
Floodplain lowering/widening and roughed-in trail being funded by existing FHR grant  
Incorporate existing Visitor Center 1993 facilities and 2015 outdoor classroom into project design  
Pursue future funding for trail improvements and sound wall along I-5

County Offices Sub-reach:

Remove developed areas from 100-year flood zone by lowering/widening floodplain  
Leave retaining wall on westside but install boulders and plant trees at base  
Re-route portions of creek to restore meanders  
Extend County bridge and relocate/improve private bridge as shared bridge  
Include portion of Juvenile Lane along creek in floodplain lowering/widening  
Acquire private parking area along creek and include in floodplain lowering/widening  
Provide replacement private parking nearby on County site  
Establish new road access to County site and apartments using Annie Street  
Improve County parking configuration and capacity  
Use parking area on south side of site for spoils disposal, thereby raising parking  
Include sound berm along I-5 using spoils  
Open up riparian vegetation to discourage transient use, and actively patrol after trail built

State-Raymond Sub-reach:

Switch trail from eastside to westside along this sub-reach to avoid back yards  
Include main trail bridge to accomplish this and connect to commercial area  
Acquire vacant lot along creek for connection and future tie-in to City Hall and schools  
Acquire several residential properties needed for floodplain lowering/widening  
Pursue future funding for sound wall along I-5

Raymond-Miner Sub-reach (East side of creek):

Construct secondary trail on Caltrans ROW along east side of creek  
This will provide interim greenway connectivity and patrolling while working on west side  
Open up riparian vegetation to discourage transient use, and actively patrol after trail built

Raymond-Miner Sub-reach (West side of creek):

Increase flood passage and accommodate trail under Raymond Street Bridge  
Re-design/raise Bottling Works parking and ingress-egress  
Consider removal/relocation of one of rental houses in this area  
Include main trail tie-ins to Bottling Works (via stairs) and Center Street  
Include tie-in between Bottling Works and parking (via second trail bridge)  
Remove or relocate concrete retaining wall on west side of creek  
Re-design Baxter and Pacific Power storage areas  
Open up riparian vegetation to discourage transient use, and actively patrol after trail built

Miner-Lennox Sub-reach (East side of creek):

Construct secondary trail on Caltrans ROW along east side of creek  
This will provide interim greenway connectivity and patrolling while working on west side  
Open up riparian vegetation to discourage transient use, and actively patrol after trail built

Miner-Lennox Sub-reach (West side of creek):

Increase flood passage and accommodate trail under Center Street Bridge  
Increase flood passage under Lennox St Bridge  
Major excavation into bedrock required opposite Miner's Inn if lowering/widening done there  
Can't use blasting, so cost will be higher and will take much longer  
Good source of boulders for instream structures, rip-rap, barriers, etc.  
Another solution is to relocate east wing of Miner's Inn using grant funding  
Relocation makes more room for trail and motel upgrade could be desirable  
Remaining commercial properties are more straightforward  
Acquire several residential properties needed for floodplain lowering/widening

Lennox-Deer Creek Sub-reach (= FHR North Reach):

This sub-reach at design stage now and scheduled for floodplain widening/lowering in 2018  
Additional grant funding will be needed to complete all floodplain widening/lowering and trails  
Include side channels and bottomland beaver habitat; retain large oaks on raised mounds  
Re-route portions of creek channel to restore meanders  
Shorten Caltrans culvert and install retention basin and bioswale  
Install retention basin and bioswale for runoff from Yreka Shopping Center parking area  
Do PLA to increase size of AmeriGas parcel  
Incorporate retention basins and bioswales in future development of AmeriGas parcel  
Dispose of spoils on Caltrans ROW, Handley, and City yard by wastewater treatment facility  
Combine maintenance road and main trail, and provide secondary trail close to creek  
Include secondary trails with float-aside boardwalks to connect to Blake St. and Shopping Center  
Include trail and bridge over Little Humbug Creek to connect Burgess Street blocks  
Include trail bridge and secondary trail for Community Center tie-in (see below)  
Open up riparian vegetation to discourage transient use, and actively patrol after trail built  
Work with private owners on west side of creek to incorporate floodplain and open up vegetation

Deer Creek Sub-reach:

This project was mostly completed in 2015  
Remove berms along creek to increase floodway capacity

- Re-construct portion of picnic area closest to creek to increase floodway capacity
- Add tertiary trail along creek
- Relocate bicycle rack away from creek overlook area
- Remove white fence barriers at stubbed-out sidewalks
- Fund these improvements by combining with a grant for a larger nearby project
- Implement Greenway host program using recently-installed RV hookup

Wastewater Treatment Facility Sub-reach:

- Obtain grant to design changes to disposal of treated wastewater
- Refurbish/expand existing sewer ponds to function like Arcata Marsh Project
- Create new channel as bioswale for small channelized drainage entering from west
- Incorporate pond outflow into that bioswale
- Remove portion of levee downstream from treatment facilities
- Lower/widen floodplain downstream from treatment facilities
- Install trail bridge over creek and extend main trail along west side from Deer Creek Sub-reach
- Include secondary trail through ponds area for bird watching (like Arcata Marsh Project)

Effluent Disposal Field Sub-reach:

- If feasible and funded, remove disposal field piping and levee and restore historic floodplain
- Include side channels and bottomland beaver habitat.
- Re-route portions of creek channel to restore meanders
- Work with private landowners for needed acquisitions and removing them from 100-year flood zone
- Relocate private driveway/bridge out of flood zone, using Deer Creek Way for access
- Relocate eastern half of mini-storage to adjacent Hwy 263 frontage to remove from 100-year zone
- Include main trail along west side of creek and install trailhead at downstream end of City land
- Include tertiary trail on east side of creek downstream from private homes

Lower Yreka Creek Phase 3 Sub-reach:

- Outside City Limits and all private land; SGPGA taking lead
- Highest priority portion of creek for coho salmon, which could attract new funding sources
- Primary landowner is working with SGPGA on restoration plan and future land uses
- Creek is very incised and up against east side of historic floodplain due to past dredging
- Lower/widen floodplain via grant funding and stockpile spoils for future use at existing quarry
- Re-route portions of creek to restore geomorphology
- Include side channels and bottomland beaver habitat where feasible
- Re-route/restore Long Gulch channel through site
- Consider using some spoils for future development pads along Hwy 263

Lower Yreka Creek Phase 2 Sub-reach:

- Outside City Limits and all private land; SGPGA taking lead
- Highest priority portion of creek for coho salmon, which could attract new funding sources
- Primary landowner is working with SGPGA on restoration plan and future land uses
- Several adjacent private landowners will need to be included in planning and restoration
- Two small private inholdings could be reconfigured to accommodate restoration
- Creek is very incised and up against east side of historic floodplain due to past dredging
- Lower/widen floodplain via grant funding and stockpile spoils for future use at existing quarry
- Incorporate quarry site into restoration after all spoils have been processed and sold
- Re-route portions of creek to restore geomorphology
- Include side channels and bottomland beaver habitat where feasible
- Increase flood passage under Anderson Grade Road Bridge
- Consider using some spoils for future development pads along Hwy 263

Lower Yreka Creek Phase 1 Sub-reach:

- Outside City Limits and all private land; SGPGA taking lead
- Highest priority portion of creek for coho salmon, which could attract new funding sources
- Primary landowner is working with SGPGA on restoration plan and future land uses
- Funding obtained and design underway for coho salmon side channel near mouth of creek
- Several adjacent private landowners will need to be included in planning and restoration

Creek is very incised and up against east side of historic floodplain due to past dredging  
Lower/widen floodplain via grant funding and stockpile spoils for future use at existing quarry  
Re-route portions of creek to restore geomorphology  
Include side channels and bottomland beaver habitat where feasible  
Consider using some spoils for future development pads along Hwy 263

## **Greenhorn Creek:**

### Greenhorn Falls Sub-reach:

Use similar design approach as Phases 1-3  
Convert gravel borrow pit (pond) to floodplain  
Include trail bridge above (or below) falls  
Include trailhead parking at downstream and upstream ends  
Replace culverts at downstream road crossing with bridge  
Relocate barn that is encroaching on City property (will make room for trail)  
Complete prior to fish passage over dam

### Upper Greenhorn Phase 3a Sub-reach:

Construction documents have been prepared but permits have expired  
Complete prior to fish passage over dam  
Explore provision of City water to nearby residents in order to remove wells along creek

### Upper Greenhorn Phase 3b Sub-reach:

Land exchange needed for southside trail and to bring lands near creek into Park ownership  
Portion of City land away from creek and near private residence could be traded  
Trade land is mostly old pasture that would have more use to private owner than to Park  
Re-route roads to residences to benefit landowners and trail routing

### Upper Greenhorn Phase 2 Sub-reach:

Construction documents have been prepared but permits have expired  
Complete prior to fish passage over dam  
Explore provision of City water to nearby residents in order to remove wells along creek

### Upper Greenhorn Phase 1 Sub-reach:

Floodplain restoration and trail improvements were mostly completed in 2012  
Install overflow culverts at main bridge to Old Town  
Install rock vanes by main bridge and above/below sediment basin  
Find grant funding to restore Old Town  
Implement Park host program using recently installed RV hookup

### Greenhorn Reservoir Sub-reach:

Reservoir basin sediment removal was completed in 2007  
Retrofit spillway for fish passage and stormwater attenuation  
Install rock vanes between sediment basin and reservoir (channel armoring at low water level)  
Prepare recreational fishing plan for Reservoir that accommodates salmonid reintroduction  
Consider removing large-mouth bass from Reservoir (predators on juvenile salmonids)  
Upgrade trail bridge over North Channel entering Reservoir  
Install boardwalk or armored dip at sediment basin overflow  
Install turtle viewing platform near NW corner of Reservoir

### Lower Greenhorn Sub-reach:

Conduct periodic spawning gravel augmentation below dam  
Consider seasonal flow augmentation below dam  
Include side channels and bottomland beaver habitat  
Floodplain widening/lowering and low wall near Main Street will resolve flooding along Main Street  
Increase flood passage under Oregon Street—major existing impediment  
Make room for trail under Oregon Street when crossing is improved—use at-grade crossing in interim  
Consider Ralph Starritt's offer to sell his property for art park

Use north box culvert for interim crossing under I-5, but explore future option of trail bridge over I-5  
Install low weir to deflect low flows into south box culvert to keep north box culvert dry  
Install lighting in north box culvert for trail  
Include various trail connections in Lower Greenhorn Park and to COS  
Incorporate Arboretum into Greenway; consider moving it to City lot across street  
Work with PP&L to purchase undeveloped parcel on Oregon St and move building onto that parcel  
Acquire strips of land along back ends of 3 storage yards to achieve needed floodplain width  
Work with PP&L to construct berm around portion of substation for screening and flood protection  
Dispose of remaining spoils at base of dam—pending authorization from Division of Safety of Dams

## **Little Humbug Creek:**

### Upper Humbug Hollow Sub-reach:

Lower/widen floodplain in dredged area and re-route creek to restore meanders  
Construct several smaller at-grade attenuation basins rather than single large basin  
Explore feasibility of bypass culvert to Yreka Creek  
Work with church and adjacent private landowners to dispose of spoils nearby  
Replace culvert with small bridge at upper Lane Street crossing by church  
Consider trail loop at Humbug Hollow if supported by homeowners

### Lower Humbug Hollow Sub-reach:

Increase flood passage under Lane Street  
This sub-reach is more difficult due to small lots with improvements—could defer  
Discuss with landowners a potential trail from Miner Street Park to Humbug Hollow along creek

### Miner Street Park Sub-reach:

Implement this reach as relatively low cost straightforward demonstration project  
Remove existing culvert under West Street  
Remove portions of West and Hearn Streets; link Hearn and West Streets on west side of creek  
Add parking and use route through parking to connect with portion of Hearn east of creek  
Demolish existing skateboard park and obtain funding for a new and better one elsewhere in Park  
Provides access to tennis courts and alley  
Replace 2 residential bridges with longer bridges and re-do driveways, using grant funding

### Miner-North Sub-reach:

This sub-reach is highly constrained by numerous small developed residential lots (19)  
Most impediments involve out-buildings, but 4 houses would need to be moved  
Increase flood passage where creek flows through culverts under Miner and North Streets  
Re-route creek along North Street so that new crossing is more perpendicular (shorter)  
Add bridge for 1 residential driveway

### Gold Street Garden Sub-reach:

Implement this reach as inexpensive easy-to-implement demonstration project  
Transplant recently-planted trees before they get too large  
Relocate memorial plaques while transplanting memorial trees  
Lower channel and floodplain grade to anticipate future work on adjacent sub-reaches  
Use spoils for new landscape berms

### Gold Street School Sub-reach:

School districts are outside City jurisdiction; project being pursued by SGPGA and District  
Re-design parking and include bioswale/retention basin to intercept parking runoff  
Dispose of spoils at NW corner of school and on adjacent private parcel if landowner agrees

### Lower Humbug Sub-reach:

This is worst sub-reach in terms of flooding, due to side slope and spilling to east  
It will be highest priority if nothing can be done upstream to attenuate high flows (e.g., bypass)  
Upper channel is highly constrained by Gold Street on one side and yards/buildings on other  
This sub-reach involves 35 small developed residential lots and 4 small developed commercial lots

Only 2 main houses in way; mostly variety of out-buildings (some of which are converted to dwellings)  
Show owners flood reduction benefits of moving out-buildings and widening/deepening floodway  
Increase flood passage where creek flows under Gold, Pine, Oregon, Third, and Main Streets  
Remove long culvert and road crossing at Spring Street  
Relocate parking and access for Yreka Immediate Care Clinic to Spring Street  
Connect portion of Spring Street on south side of creek to Virginia Street  
Leave portion of Spring Street on north side as dead-end  
Include a berm on the east side of the creek at the upstream end  
Re-route channel to add meanders within widened floodplain  
Over-widen floodplain between Pine and Oregon Streets for additional attenuation/infiltration  
Consider improving existing trail from Pine Street to Oregon Street if landowners agree

### **Juniper Creek:**

#### Mid-Juniper Creek Phase 2 Sub-reach:

Outside City Limits; SGPGA and/or County will need to take lead  
Major source of floodwater and sediment to City  
Properties are mostly within 100-year flood zone, therefore major landowner benefits  
Good locations for spoils to create elevated building pads  
Mix of commercial, residential, and openspace  
Increase flood passage at Fairlane Road, and Schantz Lane (x2)  
Remove 1 private crossing and relocate access from Fairlane Road to Singleton Lane  
Three houses, one storage building, and 12 out-buildings are in way of floodplain widening  
Floodplain widening affects portions of 2 storage yards

#### Mid-Juniper Creek Phase 1 Sub-reach:

Outside City Limits; SGPGA and/or County will need to take lead  
Major source of floodwater and sediment to City  
Properties are mostly within 100-year flood zone, therefore major landowner benefits  
Good locations for spoils to create elevated building pads  
Mix of commercial, residential, and openspace, plus a mobile home park  
Increase flood passage at Singleton Lane, Arroyo Drive, Rolling Hills Drive, and private drives (2)  
Consider re-routing 1 private drive from Fairlane Road to Schantz Lane  
Floodplain widening affects portions of 4 storage yards and 1 concrete plant, and 3 small sheds

## UNNAMED TRIBUTARIES TO YREKA CREEK

### **Pine Mountain Drainage:**

#### Moonlit-Main Sub-reach:

Affected properties are commercial (3) and governmental (Caltrans and County)  
Bioswales and small retention basins are proposed along mostly existing drainage route  
Opportunity to intercept/slow down/filter/infiltrate upstream, building, and parking runoff  
Great demonstration potential; no impacts on land uses

### **Sharps Road Drainage:**

#### County Public Works Sub-reach:

Affected properties are light industrial (2) and governmental (County)  
Bioswales and small retention basins are proposed along mostly existing drainage routes  
Opportunity to intercept/slow down/filter/infiltrate building, parking, and industrial runoff  
Great demonstration potential; no impacts on land uses

#### Trailer Park/Casino Sub-reach:

Affected properties are trailer park and mostly undeveloped Casino properties  
Lower/widen existing drainage channel on east side of trailer park  
Lower/widen NW portion of Casino property to tie-in to adjacent floodplain restoration

Use most of Casino property for spoils disposal from nearby projects, creating raised building pad  
Raise existing small levee around trailer park to provide additional flood protection  
Include trails to connect Casino and trailer park to Greenway

### **East Oberlin Drainage:**

#### Upper East Oberlin Sub-reach:

Stormwater appears to have been effectively captured along this sub-reach  
Primary opportunity is to restore/re-water original drainage for MS4 and wildlife benefits  
Benefits include inducing more infiltration for aquifer recharge and higher water table  
Opportunity for small retention basin at Comstock Drive  
Very few improvements in way; mostly some sheds  
Numerous small-lot landowners involved (32)  
Some trail segments make sense where there are existing paths

#### Lower East Oberlin Sub-reach:

Major ephemeral drainage—60” culvert daylights at upstream end of this sub-reach  
May have been intermittent drainage before storm drain system was installed  
Drainage re-enters storm drain system at downstream end of JB Oberlin Storage  
From there it is culverted to Yreka Creek  
Retrofit culvert inlet to keep base flows and smaller storm runoff at surface  
Retain existing culvert to Yreka Creek to serve as bypass for larger flows  
Install new culvert across Oberlin Road, then follow existing ditch along RR tracks  
Convert constructed drainage ditches on north side of Oberlin to natural channel/floodplain  
Utilize existing armored channel at transition to Yreka Creek floodplain (Oberlin-Young Sub-reach)  
Include trail—serves as a great connection between Yreka Creek and E Oberlin neighborhood

### **Shasta Avenue Drainage:**

#### Evergreen School Sub-reach:

Started in 2015 and will be completed in 2017  
Excellent opportunity to include K-3 school in Greenway program  
School districts are outside City jurisdiction; project being pursued by SGPGA and District  
Consists of bioswales and small retention basins to intercept/slow down/filter/infiltrate runoff  
Bioswales are being planted with native species and will provide urban wildlife habitat  
Boulders and streambed cobble/gravel included to make it look natural but also attractive  
Also serves as demonstration project for drought-tolerant landscaping  
All school runoff originally flowed onto street then to undersized City storm drain to Yreka Creek  
Excellent opportunity to directly include elementary school in Greenway program  
Students are participating in planting, and follow-up studies in wildlife and water quality  
Main parking area upgraded to route runoff to bioswales  
Trail to Shasta Avenue Park and onward to Jackson Street School being included  
Trails will also provide safe off-street route to school  
PLA needed between District, County, and City to place Shasta Avenue Park into one ownership

#### County Office of Education Sub-reach:

Location of Shasta Avenue stormwater attenuation basin installed in 2009  
Cover rip-rap with topsoil along Shasta Avenue to soften grade and enable revegetation  
Place topsoil on remaining basin sides to soften grade and enable perimeter fence to be removed  
Only sub-reach where extensive existing wet meadow exists; preserve what is left  
Assist in acquiring undeveloped portion of private land between County and Jackson Street School  
Consider educational/wildlife pond (freshwater marsh) on that property, to double as retention basin  
Similar to pond at Sisson Meadow in Mount Shasta, used by Sisson School  
Route runoff from Jackson Street and County facilities to pond/basin  
Construct paved multi-use trails to Shasta Avenue, Evergreen School, and Jackson Street School  
Replace existing filled causeway across meadow to Childs Way facility with raised boardwalk  
Replace boardwalk across meadow to Jackson Street School with upgraded boardwalk  
Include security fencing where needed to separate public trails from school facilities

#### Jackson Street School Sub-reach:

School districts are outside City jurisdiction; project will be pursued by SGPGA and District  
Most school runoff flows onto street then to City storm drain to Yreka Creek  
Project will consist of bioswales and small retention basins to intercept/slow down/filter/infiltrate runoff  
Retrofit existing old storm drain inlet at east edge of private parcel to enable surface flows  
From that point downstream convert mainly lawn areas to natural bioswales  
Tie bioswales back into storm drain system at corner of Jackson and Fourth Streets  
Runoff from school buildings, lawns, and paved play areas will be directed to bioswales  
Runoff from City Hall and County Library facilities will also be captured  
Will serve as excellent demonstration project at City Hall  
New parking area for District Office will be included  
Excellent opportunity to directly include secondary school (4-8) in Greenway program  
Students will participate in planting and follow-up studies on native plants, wildlife, water quality  
Trail from Evergreen School to City Hall will be included, with potential tie-in to Yreka Creek  
Trails will also provide safe off-street route to school  
Include security fencing where needed to separate public trails from school facilities

#### Fourth-Main Sub-reach:

There are 2 potential routes for Greenway/trail: Dillon Street and next to Jackson Street  
Using Dillon Street would involve closing the street to traffic  
The only feasible route for including a bioswale is next to Jackson Street (due to grade)  
Either or both of these routes would provide a key tie-in to the Greenway along Yreka Creek  
They would also greatly enhance City Hall and vicinity, creating a community focal point  
On Dillon Street, lawn areas could be provided for activities like crafts fairs and farmers' markets  
Opportunity to greatly improve intersections of Broadway and Jackson with Main  
Liberty Tax and Jolley's Club would need to be relocated  
Opportunity to provide substantial additional parking by Family Carpet 'N Things  
Ace Hardware could use Yreka Street and own parking area for deliveries  
Bioswales in front of Ace Hardware and carpet store would intercept significant runoff  
Opportunity to provide trail linkage from schools, City Hall, and Library to Yreka Creek

#### **High School Drainage:**

##### High School Sub-reach:

School districts are outside City jurisdiction; project will be pursued by SGPGA and District  
Same benefits as for elementary/secondary schools on Jackson and Evergreen Sub-reaches  
Can also provide vocational learning opportunities for high school students  
(In same spirit as ag program facilities on high school campus)  
Revamp existing small landscape demo area in ag complex to reflect Greenway goals  
Revise storm drain at alley behind Pioneer Street at Barham Street to provide surface flows  
Consider potential conversion of old tennis courts to attenuation basin  
Convert selected lawn areas to bioswales and small retention basins near buildings  
Tie-in existing spring and swale on SW side of main high school building complex  
Include an attenuation basin on east side of new gymnasium  
Upgrade existing YHS northside drainage to a bioswale  
Convert wet area at NW corner of ballfield to a small freshwater marsh  
Intercept runoff from fields, buildings, and parking on S, N, and E sides of YHS  
Convert existing sidewalk crossing at entrance to south parking to a multi-use trail crossing  
Trails will provide safe off-street routes to school, and on-campus running routes  
Links YHS, Community Theater/Center, and Yreka Creek together

##### Community Center Sub-reach:

Route main YHS building complex runoff through Community Center site  
Install retention basin in lawn area in front of Theater  
Install bioswale from retention basin through rest of front area, including under walkways  
Route front bioswale and back parking area runoff into existing pond below Community Center  
Enlarge existing pond to double as an attenuation basin

Re-route YHS drainage along N side of Teebe Way to add meanders, accommodate trail  
Add bioswale along base of Handley lot on S side of Teebe Way and tie-in on N side  
Block culvert under Mtn View Inn and route drainage to enlarged pond/attenuation basin  
Businesses along west side of Main Street benefit from intercepting runoff behind them  
Route outlet of basin through undeveloped portion of Steinhoff lot and under Main Street  
Coord with Handley on filling "L" shaped lot behind businesses at NE corner of Hwy 263/Hwy 3  
Construct new drainage/floodplain from Hwy 263 to Yreka Creek; use in part as mitigation  
Coordinate with Hanley on disposing of remainder of spoils on lots on N & S sides of Teebe Way  
Construct multi-use trails from YHS and Community Center to Yreka Creek along drainages  
Involves mid-block pedestrian crossing on Hwy 263, but no room for trails at intersection  
Portion of Yreka Creek accessed by trail is existing location of YHS outdoor education field trips  
Install permanent bridge across Yreka Creek to tie-in to main Greenway Trail along creek

## UNNAMED TRIBUTARIES TO GREENHORN CREEK

### **Bennett Drive Drainage:**

#### Bennett Drive Sub-reach:

Intercept roadside ditch runoff at midpoint and bottom of Bennett Dr and route to natural drainage  
Install retention basin at bottom of natural drainage at inlet to existing culvert under Greenhorn Rd  
Intercept roadside ditch runoff along Greenhorn Rd just west of Upper Park entrance  
Route both to Greenhorn Creek North Channel south of Greenhorn Rd (= natural bioswale)  
Intercept underground storm drain from Upper Park Entrance to Substation and route to Lower Creek  
Runoff from that point eastward will continue to be routed to Oberlin-Young Sub-reach  
Construct bioswale to filter road runoff before entering Lower Greenhorn Creek

### **COS Drainage:**

#### COS-CDFW Sub-reach:

Intercept COS, Nor-Cal, and Recycling Center runoff and route to CDFW lot along W-side Oregon St  
Install bioswales along these routes where opportunities allow  
Install bioswales and retention basin/wet meadow on CDFW lot, with outflow metering box  
Install sidewalk/curb/gutter along Greenhorn Road and Oregon Street in this area  
Install trail from COS campus to Lower Greenhorn Park  
Explore idea of relocating Arboretum to City lot on SE corner of Campus Dr and Greenhorn Rd  
City lot site is larger, has more sun, and could provide vocational opportunities for COS students

## UNNAMED TRIBUTARIES TO LITTLE HUMBUG CREEK

### **Lane-Miner Drainage:**

#### Upper Lane-Miner Sub-reach:

From end of Julien Ct to Lange Way, widening, daylighting, and channel meandering is desirable  
From Lange Way to Patricia Way culvert, drainage is intact and just needs re-watering  
From Patricia Way culvert to DeWitt Way, drainage needs lowering/widening and natives reveg  
Work with landowners on north side to do widening  
This sub-reach involves 15 small private parcels along 1-1/2 city blocks

#### Lower Lane-Miner Sub-reach:

Install new storm drain along DeWitt Way to convey runoff to historic drainage route S of Arlene Ct  
Re-establish/re-water historic channel from DeWitt Way to culvert from Arlene Court  
Existing channel across property at Arlene Ct culvert outlet is good example as landscape feature  
From there to Fairchild Street, existing drainage is in ditch in front of 2 houses  
Should be re-routed to historic location behind houses where grade is lower and there is more room  
Downstream from Fairchild Street, historic channel is intact  
This sub-reach involves 22 small private parcels along 2 city blocks

## **Miner-North Drainage:**

### Upper Miner-North Sub-reach:

Natural runoff is intercepted at Lange Way and piped to Little Humbug Creek  
Retrofit inlet at Lange Way to convey small storm flows through historic channel to Humbug Creek  
This sub-reach involves 34 small private parcels along 1-1/2 city blocks  
2 small out-buildings need to be moved  
Culverting under 1 backyard required

### Lower Miner-North Sub-reach:

Continuation of re-watering historic channel as described for upper sub-reach  
Lower sub-reach involves 18 small private parcels along 1-1/2 city blocks  
2 small out-buildings need to be moved  
Culverting under 2 backyards required

## **North-Yama Drainage:**

### Upper North-Yama Sub-reach:

Natural runoff is intercepted at west end of Yama St and piped to downstream side of Hillcrest Dr  
Opportunity exists to construct above-ground channel in lieu of this culverted portion  
From Hillcrest Drive downstream to Fairchild Street, the historic drainage is still functional  
This sub-reach involves 25 small private parcels along 2-1/2 city blocks  
3 small out-buildings need to be moved

### Lower North-Yama Sub-reach:

Runoff in historic channel is intercepted at Fairchild Street and piped to Gold Street School  
Install new culvert to re-water historic channel from Fairchild Street to Gold Street Garden  
This sub-reach involves 18 small private parcels along 1 long city block  
4 small out-buildings need to be moved

## **Cedar-Terrace Drainage:**

### Upper Cedar-Terrace Sub-reach:

Natural runoff is intercepted at west end of Terrace St and piped to historic channel below Elena Way  
Opportunity to install retention basin at end of Terrace Street  
New culvert needed from retention basin to re-water historic channel below Wetzel Way  
This sub-reach involves 11 small private parcels along 1-1/2 city blocks  
4 small out-buildings need to be moved

### Lower Cedar-Terrace Sub-reach:

Historic drainage is intact and watered from Elena Way to Discovery Street  
Runoff is intercepted at Discovery Street and piped to Barham Street Attenuation Basin  
Install low-flow bypass at Discovery Street and re-water historic channel to Barham Street Basin  
Restore channel into Barham Street Basin (disrupted during Basin construction)  
This sub-reach involves 18 small private parcels along 2 city blocks  
4 small out-buildings need to be moved

### Ringe Park/Stadium Sub-reach:

Existing Barham Street Attenuation Basin has good channel structure and native veg in bottom  
Good example of what could be done at Shasta Avenue Attenuation Basin  
Barham Street Basin currently intercepts all runoff and pipes it to Yreka Creek  
Install small outlet culvert through Basin berm to allow small downstream surface flows  
Basin spillway has secondary shallow basin at base but no outlet channel  
Construct new channel from spillway base, also picking up new low-flow culvert outlet  
Route new channel through Lutheran Church property, under Sherman St, and through Ringe Park  
Church is only private land involved in this sub-reach  
Install small retention basin/wet meadow in Ringe Park, while retaining most of lawn area

Alternative to wet meadow in basin would be lowered lawn area  
 Could tie-in drainage to Knapp Street storm drain if going further downstream is problem  
 Going further downstream requires a mix of culverts between bioswale areas  
 Would still yield MS4 benefits by intercepting parking and stadium runoff  
 Also, ties-in Community Garden and provides good trail linkages throughout sub-reach  
 Fencing at Stadium and Community Garden would need to be worked out  
 Stadium parking design is sub-standard, but there is room to resolve this  
 At Oregon Street, drainage could be culverted and routed to Little Humbug by Lennox  
 Going further downstream above ground depends on private landowners (Lower Humbug Sub-reach)  
 A trail is recommended from Oregon Street to Barham Street along the drainage route  
 At Barham Street Attenuation Basin, the existing fence should be removed (use signs for safety)  
 The trail would tie-in with an existing alley extending west from Barham Street to Discovery Street  
 The trail would provide important linkages between residential areas, Ringe Park, and YHS Stadium

## REST OF CITY

In remaining portions of the City outside the above sub-reaches, FHR and MS4 goals can be met via onsite solutions (i.e., no offsite runoff), and where existing storm drains from those areas empty into Greenway sub-reaches. The Greenway Master Plan only identifies sub-reaches that largely correspond to existing or historic natural drainages, as indicated by topography. An example of a large developed area that does not topographically tie-in with a Greenway sub-reach is Fairchild Hospital. Also, this Master Plan does not include the portion of the City that lies outside the Yreka Creek watershed, most notably development along Phillippe Lane. A mix of onsite stormwater mitigation and bioswales leading to the Shasta River could be employed at that location (for example what is being done at the new Fruit Growers Supply small log mill).

## SUB-REACH PRIORITIZATION

Prioritization indicated in Table 1 at the end of this Appendix is based on the following parameters:

- Flood hazard reduction benefits (Goal #1)
- Water quality benefits (Goal #2)
- Fish/wildlife benefits (Goal #3)
- Trail benefits (Goal #4)
- Current status of implementation
- Proximity to previously-implemented sub-reaches

The following priority levels are used in Table 1:

- Priority 1. Highest priority.
- Priority 2. Moderate to high priority.
- Priority 3. Low to moderate priority.
- Priority 4. Lowest priority, but still important as opportunities allow.

Figure 1. Sub-reach locations.

Table 1. Summary of design recommendations and priorities by sub-reach.