WSDOT and PCC Rail Authority
PCC Rail System Capital Maintenance Requirements Study
Eastern Washington
Task AG
Work Element 5
PCC Rail System Capital Maintenance Priority Plan – September, 2010

Per direction received, HDR will present a Priority Plan that will be based on the "Base Condition" (as presented in Work Element 3) and a 20 year period. The Base Condition details are shown below in Table 1. This Work Element will also incorporate concepts developed and presented in the PCC Normalized Maintenance Report (WE2) as well.

This report details the items and costs of bringing these branch segments to a moderate condition level based upon the operational need stated within a 20 year prioritized plan.

Table 1

Branch Segment	**Condition**
CW Branch	286K Compatible,
PV Branch-Winona to Willada	286 K Compatible
PV Branch Willada to Thornton	263K Compatible, Class 1, No Rail Replacement
Hooper Branch-Hooper to Mockonema	286K Compatible
Hooper Branch-Mockonema to Colfax	263K Compatible, Class 1, No Rail Replacement
P & L Branch-Marshall to Fallon	286K Compatible
P & L Branch-Fallon to Idaho Border at Moscow	263K Compatible, Class 1, No Rail Replacement
WIM	263K Compatible, Class 1, No Rail Replacement

Assumptions for Work Element 5

- 286k compliant track will consist of 112lb or heavier rail. Existing rail smaller than this will be replaced with 112lb (or larger) CWR.
- 286K compatibility will allow for nominal speeds of 25mph.
- Moderate siding standard presumes that rail less than 85lb rail will be replaced. Replacement rail would consist of 100lb (or larger) jointed rail. We have included this information (as developed in the WE2 report) into our plan table.
- 286k compliant timber bridges are presumed to include 50% of caps being replaced and the addition of "helper stingers".
- General life and costs of components, and tonnage (traffic) are based on the WE2 capitalized maintenance report previously provided.

- Unless otherwise indicated, this analysis presumes that work performed would be consistent with a "ten-year maintenance cycle". A maintenance cycle is generally considered to mean how often does a railroad perform normalized capital type maintenance on a line segment. This is often driven by the average quality of track the railroad desires to keep between the cycles. On many railroads the cycle is around 5 years. The 5 year cycle allows for a replacement of 1/8 of the ties if the average tie life is 40 years. This would be about 388 ties per mile. This would theoretically never allow any more than ¼ of the ties to be either poor or defective at any one time. Surfacing is usually performed with tie replacement which also keeps the track smooth and from further deterioration caused by dynamics introduced by poor track surface and line. Because the PCC is a very low traffic shortline, a 7 to 10 year cycle between capital maintenance programs might be justified. Because the speeds and annual tonnages are generally low, the track does not require surfacing as much because of dynamics. The shortline can also generally afford to place slow orders on a section of track if the maintenance cycle work is delayed and track conditions deteriorate beyond a "planned for" point.
- For the purpose of this report, "Moderate condition" is a level of maintenance considered to be sustainable; a level of maintenance that keeps the railroads condition at the desired operating condition and limits.
- Rehabilitation and maintenance work known to be performed by the operating railroads and the WSDOT within the last 6.5 years are considered in this report.
- Recommendations for the selected sidings are based on limited information in some cases and generalizations regarding the existing conditions.
- Our plan does not include any rail replacement in the 20 year horizon on 263k lines. This presumes that the eventual replacement of the rail is further deferred to a point beyond the 20 years and that the rail in these segments will continue to fail at the rate they are currently failing due to defects, etc. and are being individually (or spot) replaced by the operating railroads.
- Consistent with the prior Work Elements, this plan uses 2009 dollars.
- Our report does not consider the potential for some bridge enhancements that may be performed in 2011 by WSDOT and the current operator of the P&L line between the stations Marshall and McCoy.

The Plan Concepts

This plan uses the following foundation information including:

- PCC Rail System Capital Maintenance Requirements Study – Work Elements #2 and #3
- Historical Track Charts
- *Evaluation of the PCC Railroad for WSDOT– HDR 2003* (2003 Evaluation)
- Inspection and first hand data gathered by HDR as part of this and numerous previous task orders pertaining to the PCC.
- Contract documents provided as part of recent PCC Rehabilitation Projects or 2008, 2009 and 2010.
- Other information provided by WSDOT.

Our plan attempts to provide a recommended scope and cost for each line segment consistent with the "condition table" shown above. Plan methodology includes the following concepts.

- For segments where sustainable 286k is desired, the immediate priority becomes addressing rail replacement and bridge enhancements, except for a portion of the P&L as noted in the assumptions above.
- The rail replacement work will require other work to be performed at the same time. For example, surfacing should always be performed with a rail relay project (where the rail size is changed) because we don't want the new rail to deform (to fit the existing surface conditions). In turn, surfacing requires the ties to be in at least fair overall conditions as well. If not the ties will not "come up" and support the rails, they may break or otherwise fail as a result of the surfacing operation, or if they do become defective and are allowed to remain, there would be no support at those locations beneath the just replaced rail. Some crossings and turnouts will require work dictated by the rail replacement.
- The bridge enhancements can take place without requiring significant other work. Arguably, you could also begin to run 286k traffic on a line immediately following the bridge enhancements, as long as there was a definite plan/funding in place for rail replacement, and associated work, in the near future.
- We will presume that if rail is replaced in areas that call for it to achieve 286k, consistent with the conditions shown in the table, there are some items that will not need to be performed within the 20 year plan (such as joint rehab-maintenance where rail is replaced).
- Work that is dictated by primarily time considerations (such as tie replacement) will be performed such that a relative state of sustainability is maintained within the 20 year time. However, this means that additional work (and therefore funding) will be required in the 21st year and beyond, to keep the lines in that sustainable condition.
- Postpone any work that would be reasonable to postpone as long as expenditure was consistent with overall sustainability and general "capital" investment consistent with WE2 for that segment. Examples would be, little or no ditching and drainage work is in the 20 year plan because of recent or projects currently under way, related to those items and their long term requirements.
- It is important to recognize that methodologies for the WE2 normalized maintenance costs and the WE3 operational/loading condition costs were determined in different ways. For example, the WE3 report recognizes actual recent work performed on the lines, where as the WE2 report determines quantities on a theoretical steady state.
- In reference to the points in the previous bullet, the costs for year 1 crosstie replacement are specifically quantified to represent the actual 2003 tie index, ties replaced since, other anticipated complimentary enhancements (other year 1 work), and other current factors. Year 11 work attempts to compliment that work consistent with a theoretical component life and allows us to begin and establish a normalized maintenance cycle. It is important to note that railroad ties sometimes

don't show their true condition until they are placed under increased traffic and or increased loads. We had attempted to allow for this in our WE2 (normalized maintenance) analysis. Therefore, the tie cost in the year 11-20 cycle can be considered to be conservative.

- We also recognize that on some of the lines, the allowance for crossing rehabilitation is conservative based on our methodology. Some of the costs in year 1 could be shifted to year 11 on this item.

The Plan

Refer to Table 2 shown on the following page. The plan presents the items and expenditures required for the desired condition/operations over a 20 year period. Consistent with our methodologies and concepts of the previous work elements we have proposed work to be performed with a 10 year maintenance cycle. We have proposed a budget for each line segment for hypothetical year 1 and year 11. On the lines requiring rail replacement to be performed to reach the desired condition, the initial expenditures are very large. As briefly discussed in the prior section, some of the work can be performed in different years, but some of the work should or must be performed with other work to take advantage of efficiencies and to keep from damaging the investment.

This plan should be viewed to have some flexibility. While there are some activities that should be performed at the same time, such as tie replacement and surfacing, other activities can be performed independently, such as most drainage work and work on bridges.

The work on each line segment or portions of line segments can be performed at different times. On most railroads, track maintenance, is in fact planned this way. Say if a railroad has 1000 miles, and it plans its maintenance on a 10 year maintenance cycle, then as a goal, it would perform extensive capital maintenance on 100 of those 1000 miles, in any given year. Not only does this take advantage of the need to and efficiencies of performing some activities together, but it also keeps the equipment utilized and crews busy each and every year. If the PCC system is roughly 280 route miles, then in theory, 28 miles per year would receive significant maintenance (at least with respect to certain activates). Based on our WE2 analysis of average cost per mile per of about $22,000, this would be approximately $6.16 million per year ($22,000 x 28 miles x 10 years). This figure includes all long term rail and bridge work.

As an example and mentioned before, a consideration would be to not replace 100lb section rails immediately, but only those portions where the section is less than 100lb. In our opinion, this would still meet the requirement of a "moderate condition". There is a sizeable percentage of 100lb rail in the Hooper, as well as the CW and the P&L.

Table 2

PCC Rail System Capital Maintenance Priority Plan – September, 2010

PRIORITY PLAN YEAR 1 - 286K COMPATABILITY					
ITEM	PV - WINONA TO WILLADA	HOOPER - HOOPER TO MOCKONEMA	P&L - MARSHALL TO FALLON	CW - CHENEY TO COULEE CITY	Notes
RAIL	$5,596,800	$21,009,000	$11,357,400	$49,447,200	
TIES	$1,270,410	$3,506,801	$5,839,579	$8,689,733	
JOINTS	$0	$0	$0	$0	
SLD + BALLAST	$248,160	$981,238	$1,363,102	$2,269,146	
BRIDGE	$437,580	$2,250,588	$3,372,486	$913,600	
CROSSINGS	$148,000	$487,900	$1,144,600	$1,518,000	
CULVERTS	$0	$0	$0	$0	Based on extensive culvert work performed on the PCC in the 2010 projects
DITCHING	$0	$0	$0	$0	Based on work performed on the PCC in the 2010 projects
TURNOUTS	$90,000	$390,000	$630,000	$990,000	Based on the replacement sub 112# rail components
SIDING REPAIRS	$565,800	$1,155,600	$596,800	$589,592	Figures from Work Element 3
TOTAL	**$8,356,750**	**$29,781,126**	**$24,303,967**	**$64,417,271**	

PRIORITY PLAN YEAR 11 - 286K COMPATABILITY					
ITEM	PV - WINONA TO WILLADA	HOOPER - HOOPER TO MOCKONEMA	P&L - MARSHALL TO FALLON	CW - CHENEY TO COULEE CITY	
RAIL	$0	$0	$0	$0	
TIES	$897,242	$3,214,763	$6,787,039	$8,025,248	Based on the prorated remaining/anticipated investments in ties for years 1-20
JOINTS	$3,357	$39,045	$86,536	$16,626	
SLD + BALLAST	$90,992	$359,786	$494,093	$832,013	Based on the prorated remaining/anticipated investments in surfacing for years 1-20
BRIDGE	$329,656	$1,397,922	$1,935,335	$285,600	Based on the prorated remaining/anticipated investments in bridges for years 1-20
CROSSINGS	$2,709	$72,520	$172,987	$328,827	Based on the prorated remaining/anticipated investments in crossings for years 1-20
CULVERTS	$0	$0	$0	$0	Based on extensive culvert work performed on the PCC in the 2010 projects
DITCHING	$48,420	$188,978	$300,373	$504,252	Based on the prorated remaining/anticipated investments in ditching for years 1-20
TURNOUTS	$24,000	$88,000	$196,000	$230,000	Based on the prorated remaining/anticipated investments in the turnouts for years 1-20
TOTAL	**$1,396,376**	**$5,361,015**	**$9,972,363**	**$10,222,566**	

PRIORITY PLAN YEAR 1 - 263K COMPATABILITY					
ITEM	PV - WILLADA TO THORNTON	HOOPER - MOCKONEMA TO COLFAX	P&L - FALLON TO STATE LINE	WIM - PALOUSE TO STATE LINE	
TIES	$2,323,200	$523,746	$1,884,780	$386,417	
JOINTS	$29,212	$7,048	$27,321	$4,386	
SLD + BALLAST	$422,400	$100,751	$390,720	$75,419	
BRIDGE	$228,760	$20,178	$194,220	$0	
CROSSINGS	$79,787	$2,347	$134,933	$63,938	
CULVERTS	$10,050	$400	$39,731	$2,173	
DITCHING	$46,933	$11,194	$43,414	$8,378	This is 50% of WE3 values based on work on the PCC in the 2010 projects
TURNOUTS	$41,333	$24,000	$38,667	$0	
TOTAL	**$3,181,676**	**$689,664**	**$2,753,786**	**$540,711**	

PRIORITY PLAN YEAR 11 - 263K COMPATABILITY					
ITEM	PV - WILLADA TO THORNTON	HOOPER - MOCKONEMA TO COLFAX	P&L - FALLON TO STATE LINE	WIM - PALOUSE TO STATE LINE	
TIES	$1,505,781	$308,229	$1,823,550	$394,616	Based on the prorated remaining/anticipated investments in ties for years 1-20
JOINTS	$37,251	$4,979	$24,918	$0	
SLD + BALLAST	$154,880	$36,939	$138,406	$26,472	Based on the prorated remaining/anticipated investments in surfacing for years 1-20
BRIDGE	$203,579	$17,488	$168,324	$0	Based on the prorated remaining/anticipated investments in bridges for years 1-20
CROSSINGS	$96,135	$2,034	$114,596	$23,466	Based on the prorated remaining/anticipated investments in crossings for years 1-20
CULVERTS	$16,527	$347	$46,509	$3,092	Based on extensive culvert work performed on the PCC in the 2009 and 2010 projects
DITCHING	$81,351	$19,402	$73,372	$14,522	Based on the prorated remaining/anticipated investments in ditching for years 1-20
TURNOUTS	$41,156	$24,800	$28,178	$0	Based on the prorated remaining/anticipated investments in the turnouts for years 1-20
TOTAL	**$2,136,660**	**$414,217**	**$2,417,853**	**$462,168**	

Discussion

So what should the PCC Rail Authority do next? The first question is, which line segments are in need of enhancement to 286k and if so, in which priority order. Another related question is, would 286K capability truly change the marketability of that line segment. As we are aware, the rail traffic on the PCC line segments is largely dependent on the marketing, rates, rail car supply, and other agreements with the WSDOT operating shorelines, and shipping and receiving clients of the BNSF or UP. In the case of the CW line, it is unclear whether 286k may change the current traffic patterns on the line. In the case of the P&L line, the proposed CoAg shuttle (unit) train facility will be driving the need for improvements to bridges for example. It is imperative for the PCC Rail Authority to determine if the proposed upgrades/enhancements would in fact result in increased car loadings. This information can only come from the shippers and the operating railroads. In any case, the PCC will still require ongoing maintenance in order to allow even the existing service to continue.

A few points concerning costs should be mentioned. Our costs for some items are based on limited quantities and certain methods of installation. Items such as ties and rail replacement would most likely be lower. This would make these most costly items a bit easier to afford. However, most other items are the anticipated costs if performed in a public works contact. It should be noted that to continue to defer work has a couple of other unintended effects; it will raise the effort to bring the "same amount of work" into the project, and because of that, the unit prices will be higher, and second; the costs of performing the more significant elements of the enhancement or maintenance, will probably cost more and possibly more than even the rate of inflation. If the work is performed sooner, it would have the opposite effect regarding the above points. The other benefit is that all of the future costs are reduced when significant upgrades are made sooner.

As mentioned previously in WE2, there will be continued growing risk for the WSDOT and it contract operators if the lines are not at least maintained on a regular basis. While it is unclear that track conditions caused recent derailments on the CW line, the cost to infrastructure and equipment was substantial. At some point the operations on some portions of the line segments may become too burdensome to the operators to be interested to continue to provide service.