Attachment A
Evaluation of In-River Transportation

1.0 Introduction

The locks on the Champlain Canal have maximum usable dimensions of 300 feet in length by 43.5 feet in width and 12 feet in depth. The normal length of time required to pass through a lock is estimated by the New York State Canal Corporation at 25 to 30 minutes. The New York State Canal System Annual Traffic Report for 2002 indicates that recreational traffic accounted for over 90 percent of the vessels that passed through the locks on the Champlain Canal in that year. About 5 percent of the vessels were state owned, presumably Canal Corporation boats, and the remainder were tour boats, canal boats hired by vacationers, and cargo boats. The month with the most traffic was July.

The lock experiencing the greatest number of vessels was Lock 5 at Schuylerville; 968 vessels, including 940 recreational vessels, 18 tour boats, 1 cargo vessel, and 9 hired boats passed through the lock there. In many, if not most, instances, a number of recreational vessels were passed through the lock at one time, but this information is not broken out in the report. A white paper included in the responsiveness summary that is part of the ROD reports that as many as 20 small recreational vessels have been observed passing through the lock simultaneously. (Master Comment/Response 337804). The reader is referred to this white paper for more information on the impact of project-related vessels on normal river traffic.

The locks on the Champlain Canal are operated on an as-needed basis during regular working hours. In 2002, the regular working hours were from 7:00 AM to 10:30 PM. However, commercial users may arrange for passage through the locks at other times with advance notice to the Canal Corporation. It is anticipated that during the dredging project, arrangements will be made to operate the locks 24 hours per day to accommodate the increased traffic generated by the work boats, scows, sampling vessels and other floating plant needed. Assuming a 24-hour operating schedule and an average of 30 minutes to pass a vessel through a lock in one direction, referred to as a single lockage, 48 lockages are possible in a day.

2.0 Process, Productivity, and Potential Impact to River Traffic

The example production schedule presented in Attachment D indicates that as many as eight mechanical dredges might be operating at one time during the remediation project. Four of these dredges were assumed to be equipped with 2-cubic yard (cy) buckets at an effective production rate of 27 cy per hour for 13 hours per day. The other four dredges were assumed to have 4-cy buckets and an effective production rate of 82 cy per hour for 13 hours per day. A scow would be located at each dredge to receive the excavated sediment, while other scows would be being unloaded at a shore-based processing and transfer site or in transit between the dredges and the processing site.

A typical materials handling scow used for a project of this magnitude should be designed to carry the maximum practical load through the locks. Such a scow, with its attendant push boat, should be about 300 feet in length so that both the scow and push boat can lock through as one unit. In this case, the scow would be about 250 feet long, 40 to 43.5 feet wide, with a draft when fully loaded of no more than 12 feet. A scow of this size will carry a load of between 2,500 and 3,000 tons.

The sediment to be dredged has an average bulk density of 1.1 gram per cubic centimeter (g/cc) and an average true specific gravity of 2.5 g/cc. This translates to an average *in situ* specific weight of about 2,800 pounds per cy of wet sediment. During mechanical dredging, some water will become mixed with the sediment. Experience has shown that the added water is usually in the range of 20 percent of the *in situ* weight. Thus, a cubic yard of wet sediment weighing 2,800 pounds *in situ* on the river bed will weigh 1.2 X 2,800 lbs. = 3,360 lbs, or 1.68 tons, when the added water is taken into account. A scow with a capacity of 2,500 tons will, therefore, hold about 1,500 cy of sediment as measured *in situ* in the riverbed.

The example production schedule assumes that the 4-cy dredges will operate in areas with sufficient water depth to permit a scow to be filled to its capacity with 1,500 cy of sediment as measured *in situ*, while the 2-cy dredges would work in shallow water where the scow could only be filled to approximately 50 percent of its capacity, or 750 cy of *in situ* sediment. At an effective production rate of 82 cy of *in situ* sediment per hour, a 4-cy dredge will fill a scow in slightly over 18 hours, while a 2-cy dredge would fill a 750-cy scow in about 28 hours.

Since the example production schedule assumes 13 hours of effective dredging per day, each 4-cy dredge should be able to fill a scow in 1.4 days, while each 2-cy dredge should fill its scow in 2.1 days. Therefore, on average, four 4-cy dredges would produce 2.8 scow loads per day and four 2-cy dredges would produce 1.9 scow loads per day, for a total of 4.7 scow loads per day.

These figures, however, represent long-term averages. The example production schedule shows that eight dredges are not always operating simultaneously, so in some time periods less than 4.7 scow loads per day will be generated. On the other hand, it is possible that all eight dredges might fill their respective scows on the same day, and that eight scow loads would have to be pushed through the canal system to the processing site, while eight empty scows would have to be delivered to the dredges to allow them to continue work. In addition, it can be assumed that at least one scow load of backfill material will be arriving at the work area most days and at least one materials-handling barge carrying debris from the river will be active. Therefore, on days when the sequence of filling and unloading scows produces the maximum number of passages by these large vessels, as many as 20 scows might have to traverse portions of the canal system to enter or leave the on-shore processing site. If all these vessels must pass through a lock, approximately ten hours of lockage time will be required.

In addition to the passage of scows and push boats through the canal system, a substantial fleet of support vessels will be required to complete the project, including, among others:

- Fuel boats.
- Work boats for installing containment structures.
- Pontoon boats used for sediment and water sampling.
- Survey vessels.
- Boats carrying workers to and from the dredges.

It is anticipated that as many as 20 to 25 additional vessels will to be needed to support the work, and all of these vessels will have to be accommodated in the canal system without unduly interfering with normal traffic. Although most of these support vessels will be much smaller than the scows, and many will be able to pass through a lock together, some impact on canal operations will be unavoidable.

The example production schedule is based on the assumption that a sediment processing site will be located at the northern end of the Thompson Island Pool (TI Pool), and that this site will be constructed with sufficient capacity to handle the full daily dredging production rate established for the full scale project. If so, the sediment dredged from the TI Pool will not have to traverse any of the locks on the canal system unless it is shipped out of the area for disposal by barge. Since approximately 1,560,000 cy, or 59 percent, of the estimated 2,650,000 cy of sediment targeted for dredging is located in the TI Pool (USEPA, 2000), the majority of the traffic will not have to pass through a lock while this area is being remediated. Even if the processed sediment is shipped out by barge rather than by train, the impact on the locks should not be great.

If the processed sediment from the TI Pool is shipped for disposal by barge, it is likely that any barge sent south to the deep channel of the lower Hudson River would be fully loaded. Three fully loaded scows could transport 7,500 tons of processed sediment to the lower river per day, while four scows would be able to transport 10,000 tons per day. Assuming that processing would remove at least the additional water added to the sediment during mechanical dredging, 7,500 tons of dewatered sediment would represent about 5,350 cy of *in situ* sediment, while 10,000 tons per day would be equal to about 7,140 cy, both greater than the average volume and tonnage that would be processed in a typical day. An additional three or four barges per day moving through the seven locks between the TI Pool and the deep water channel in Albany and returning would require about four hours of additional lockage time at each lock and should not significantly impact normal navigation through those locks given the current usage rate. If necessary, the barges could make the passage during the night during times of lower recreational craft usage of the system.

3.0 Area-Specific Assessment

3.1 Lock C-5, Schuylerville

As is noted above, 968 vessels passed through Lock C-5 at Schuylerville in July 2002, or an average of 31.2 vessels per day. If each of these vessels were passed through the lock individually at 30 minutes per lockage, the lock would have been in continuous operation for slightly over 15.5 hours. Since the lock only operated from 7:00 AM to 10:30 PM, or 15.5 hours per day, it would appear that this lock was operating at its full capacity during that time period. However, this analysis is based on an average number of watercraft passing through a lock in a day and ignores the fact that traffic on holidays and weekends is usually higher than on weekdays. Furthermore, a number of recreational vessels can be locked through at one time and it appears that this is usually the case. If, on average, two recreational vessels passed through the lock together, the number of lockages needed would have been reduced from 968 to 498, and the average number of lockages per day would have been 16. If three recreational vessels were locked through together, the number of lockages needed would have been reduced to 341, or an average of 11 lockages per day out of a potential 31 lockages in 15.5 hours of operation.

The actual number of times each lock is filled or emptied per day is not reported in the Canal Corporation's annual report, so statistics on the number of hours each day that a given lock is in continuous operation, either filling or emptying, is not known. However, discussions with staff assigned to oversee the sediment sampling program conducted in 2002 and 2003 indicate that the locks are not, in fact, operating at near their full capacity.

3.2 River Section 2 and Lock C-6

River Section 2, between the Northumberland Dam and the Thompson Island Dam (TI Dam), contains an estimated 502,000 cy of sediments targeted for dredging (USEPA, 2000). Of this amount, approximately 53,500 cy are located in the landlocked section of the river between the Fort Miller Dam and the TI Dam. The 53,500 cy in the landlocked section of the river may be loaded into scows stationed in the land-cut portion of the canal north of Lock 6 and transported to the processing site at the north end of the TI Pool. This material will not have to go through any locks, but may create a minor impediment to vessels moving through the land-cut section, as they will have to maneuver around the moored scows. It may be advisable to widen the land cut somewhat to create additional width at the point selected to load the scows.

The remainder of the 502,000 cy, approximately 448,500 cy, will have to pass through Lock C-6 and the land-cut section of the canal to reach the processing site. Assuming a maximum rate of eight loaded and 8 empty scows passing through this lock on a peak day, approximately 8 hours of lockage time will be required. If an additional 2 or 3 other large work boats and up to 25 smaller support vessels must also traverse this lock in each direction on the peak day, the lock could be tied up with project related traffic for as much as 15 hours. In 2002, the peak monthly usage at Lock C-6 occurred in July, when 873 vessels passed through this lock.

Project-related vessels could have a measurable impact on recreational and other traffic at this lock, particularly on holidays and weekends when it sees the most traffic from local recreational users of the canal. To minimize this impact, it may be necessary to provide a dock for some of the support vessels such as construction inspector's boats, sampling boats, and other small craft south of Lock C- 6 and carry workers to and from the dock by car or van rather than sailing all of these vessels north to a dock in the TI Pool each day. The movement of critical scows, debris barges, and backfill barges through the lock should be possible in 10 to 12 hours of lockage time and could, if necessary, all be done during the evening and night when other traffic is limited or non-existent.

3.3 River Section 3

Approximately 562,000 cy of sediment are targeted for dredging in River Section 3 (USEPA, 2000) , generally located as follows:

- About 224,800 cy between Locks C-4 and C-5
- About 172,000 cy between Locks C-3 and C-4
- About 83,900 cy between Locks C-2 and C-3
- About 18,500 cy between Locks C-1 and C-2
- About 9,000 cy between Lock C-1 and the Federal Dam at Troy

Dredging in these areas of the river is expected to occur during the last two years of the project when the work north of Lock C-5 has been completed.

If all of the dredged sediment from River Section 3 is transported north to a processing site at the northern end of the TI Pool, it will have to pass through all locks upstream of each dredging location. The barging of 9,000 cy of sediment north from below Lock C-1 will have little noticeable impact on traffic at Lock C-1, as only 6 or 7 scow loads are targeted for dredging between Lock C-1 and the Federal Dam. Between Locks C-1 and C-2, approximately 18,500 cy are targeted for dredging and will result in from 12 to 13 scow loads passing through C-2, in addition to the six or seven scows arriving from south of Lock C-1. Locks C-3, C-4, and C-5 will see increasingly more scow traffic, but no lock is expected to be overtaxed.

3.4 Summary

In summary, it is judged that the lock capacity along the Champlain Canal is currently adequate to handle the increased traffic related to the remediation of the river without unduly interfering with other traffic, provided that arrangements are made to operate the locks 24 hours per day and provisions are made to moor the large fleet of support vehicles overnight within the pools in which the dredges are operating. Congestion and delays at locks can be minimized by limiting the movement of project related vessels through the locks to essential trips by scows, debris barges, backfill barges, and other equipment that must traverse the canal system and scheduling at least some of the trips by large vessels for nighttime hours on holidays and weekends during the peak recreational season.

Attachment B
Conceptual Design of On-Shore Dewatering and Water Treatment Processes

1.0 Introduction

In developing the example production schedule described in Attachment D, it was assumed that on-shore processing and shipping facilities would be designed with sufficient capacity to handle the maximum daily output from the dredges. In order to support this assumption, and at the recommendation of the peer review panel, a conceptual design of an on-shore sediment processing facility has been developed for the mechanical dredging scenario described in the example production schedule. As in the development of the example production schedule, it has been assumed that only one site for processing sediment might ultimately be developed, even though the ROD anticipates that two or more sites might be used. The assumption that all sediment unloading and processing must be conducted at one site is judged to be more conservative than an assumption that two or more sites will be available to reduce transport distances along the river and unload and process the wet sediment.

A schematic process flow diagram has been developed for the sediment dewatering process and is included herein as Figure B-1. The water treatment plant concept is described without the presentation of a process flow diagram, as this plant is relatively simple and the technology is well known. Inasmuch as the site(s) has not yet been selected for sediment processing, no site layout has been attempted. However, the area required for the equipment and facilities proposed in this conceptual design have been estimated and shows that the necessary facilities can be accommodated on a site of about 20 acres.

It should be emphasized that General Electric (GE) is currently preparing designs for the project that may vary significantly from that which is discussed in this attachment. This conceptual site design should not have bearing on the design selected by GE and its consultants. It is merely presented to show that at least one method of processing the sediments is available and that the project is feasible.

2.0 Sediment Processing Facility Design Considerations

2.1 Sediment Processing Rates

The rates at which sediment is dewatered and water is treated are dependent upon the type of dredges used and the method of transporting the sediment to the processing site. For consistency with the example production schedule, the conceptual design described herein assumes that mechanical dredges will be employed and that the sediment will be transported to the processing site in hopper scows. In developing the conceptual design the following rates have been assumed:

- A maximum of eight scows could arrive at the processing site in a day, four carrying 1,800 cy each and four carrying 900 cy each, for a total of 10,800 cy of slurry. Each scow will contain about 80 percent sediment as measured *in situ* with 20 percent additional water, by volume, added during dredging.

- A "typical" production day would produce about 5,670 cy of *in situ* sediment and send about 6,800 cy of slurry to the processing site, after accounting for the water mixed with the *in situ* sediment during mechanical dredging. This calculation assumes that four dredges are achieving a production rate of 82 cy /hour, four dredges are producing 27 cy/hour, and all eight dredges operate effectively 13 hours per day. (For comparison purposes, a nominal target dredging production rate of 500,000 cy/year of *in situ* sediment would produce an average daily sediment volume of 2,857 cy of *in situ,* or 3,428 cy of slurry based on 175 days of dredging.)

- The specific weight of the slurry delivered to the processing site in the scows will be approximately 95.8 pounds per cubic foot (pcf) and its solids content will be about 58 percent. These calculation is based on an average bulk density of the *in situ* sediment of 1.1 grams per cubic centimeter (g/cc) and a true specific gravity of the solids of 2.5 g/cc, the mean values measured by GE during the 2002 and 2003 sampling program. The specific weight of the slurry and solids content has been adjusted for the water added to the *in situ* sediment during dredging. This translates into the following weights and volumes for the typical day:

Volume of slurry delivered to site:	6,800 cy/day
Weight of solids delivered to site:	10,201,550 lb/day = 5,100 tons/day
Weight of water delivered to site:	7,387,330 lb/day = 885,770 gal/day
Total weight of slurry delivered:	17,588,880 lb/day =8,794 tons/day

2.2 Disposal Site Docking, Unloading, Desanding, and Flow Equalization Facilities

2.2.1 Docking

The docking and unloading facilities at the processing site must be adequate to receive and unload a maximum of eight scows in one day. While the arrival of eight scows at the site in one 24-hour period is expected to be a rare event, it is important that there be no delay in unloading, as empty scows must be returned to the dredges if they are to keep working. If a maximum of eight scows must be docked, unloaded, and sent on their return trip to the dredges in 24 hours, each scow must be unloaded in less than three hours, on average. It should be noted, however, that some of the scows will carry 1,800 cy, while some arrive with only 900 cy of slurry.

Even if scows are to be unloaded in three hours or less, the docking area should provide room for at least four scows. Assuming that the total length of a scow and push boat together is 300 ft, the portion of the dock allocated to unloading should be at least 1,200 ft long. This would provide room for up to four scows to be docked simultaneously. When one scow is unloaded, it would be moved away from the dock by a push boat and retuned to the dredging area. The remaining scows at the dock would be moved along the wharf by push boat or electric winches to the unloading station.

2.2.2 Unloading and Desanding

The conceptual design for the docking and unloading facilities includes:

- A hydraulic pump-out system to remove the slurry from the scows.
- A hydrocyclone and screening tower to remove sand and gravel from the slurry.
- An equalization basin to receive the desanded slurry.

Inasmuch as the slurry in the scows is expected to contain about 58% solids, by weight, it will be necessary to dilute this slurry prior to pumping it. Accordingly, the conceptual design provides for recycling supernatant from the equalization basin to the pump-out unit to reduce the percentage of solids to a range of from 30 to 40%. This recycled water must also be pumped, and the pump-out system must be sized to account for it.

In selecting the capacity of the hydraulic pump-out system, it has been assumed that the slurry arriving at the site will be diluted from a solids content of about 58%, by weight, to about 30%. This dilution requires the addition of approximately 1.4 cy of recycle water to each cubic yard of slurry in the scow. Therefore, 10,800 cy of slurry delivered to the dock will require the pumping of about 25,920 cy (2.4 X 10,800 cy) of slurry. This is equivalent to about 5,235,000 gallons of slurry. Allotting 20 hours to pumping out the scows and the remaining four hours to docking and pulling the scows away from the dock after unloading, the pump-out unit's capacity should be about 4,400 gpm.

In the conceptual design, the hydraulic off-loader pumps the diluted slurry from the scows to the top of a hydrocyclone and screening tower designed to remove sand and gravel from slurry. The top of this tower contains a shaker screen sized to remove vegetation, roots, bottles, and other material, including stones, in excess of one inch in diameter. The slurry that passes through this screen enters a battery of hydrocyclones sized to separate gravel and coarse sand from the flow. The overflow from these hydrocyclones falls to a second battery of hydrocyclones sized to remove medium and fine sand from the flow. The overflow from this second battery of hydrocyclones contains the silt and clay-sized particles, wood chips, and other material with a low specific gravity, and discharges into an equalization basin.

The gravel and sand removed in the hydrocyclones fall through chutes onto a second shaker screen where any free water drains to the equalization basin. The shaker screens discharge to a conveyor, which places the sand, gravel, and oversized debris into a stockpile or containers. This material should pass a paint filter test for free water and be suitable for shipping to disposal without further processing.

2.2.3 Flow Equalization

The equalization basin should be sized to receive at least one day's production by the dredges, plus an allowance for water from decontamination stations and storm water runoff from stockpiles and other areas of the site where PCB-contaminated sediments are handled. On the rare days that eight dredges containing a total of 10,800 cy of slurry must be unloaded in a 24-hour period, the net volume of slurry discharged to the basin would be 2,181,000 gallons. The volume of storm water runoff produced during a one-inch rainfall on 15 acres (that portion of the 20 acre site that will be used for handling PCB-contaminated sediment), assuming that 90 percent runs off into the basin, is approximately 406,000 gallons. For conceptual design purposes, a 3 million-gallon basin has been selected to provide somewhat more than a full day's storage on those days. On a more typical day when about 6,800 cy (1,374,000 gallons) of slurry are delivered and there is no significant rainfall, a 3 million-gallon basin will provide slightly over two days' holding capacity.

The basin would be constructed by excavating a depression and using the excavated soil to construct low earthen berms. The basin would then be lined with a heavy duty, high-density polyethylene geomembrane. Assuming that the basin is designed to hold an eight-foot depth of slurry, with two ft of freeboard to the tops of the berms, it would occupy an area of about 1.5 acres.

2.3 Fine Sediment Dewatering Facilities

The equalization basin described above will provide for storage of excess slurry on days when the dredges produce more sediment then expected under "typical" operating conditions. This storage capacity reduces the processing rate required of all processes downstream from the basin, including the dewatering of fine sediment and treatment of the resulting water. Furthermore, the screening and hydrocyclone tower included in the conceptual design removes a portion of the sediment from the flow stream and diverts it to the stockpiles of material ready for shipping to a disposal site.

Hydrocyclones and screens are very efficient at removing sand and gravel from a slurry stream, provided that they are operated correctly, and can separate sand and gravel from a slurry containing a large proportion those sediments from the finer silts and clay particles. The slurry remaining after desanding with screens and hydrocyclones will contain a preponderance of silt and clay and will be difficult to dewater. This is the slurry that will be temporarily stored in the equalization basin for further processing.

Typically, for projects where mechanical dewatering of the fine sediment is necessary, it is accomplished using filter presses or centrifuges. The conceptual design proposed herein employs recessed-cavity filter presses that depend upon water pressure to compress and dewater the silt and clay. These filter presses contain a series of cavities or pockets that are lined with fine screens. Chemicals, usually lime or a synthetic polymer, are added to the slurry to improve its dewatering characteristics and the slurry is pumped into the press cavities by a feed pump.

The solids are trapped by the screens in the cavities while the water passes through the screens and out of the press to a water treatment plant. As the cavities become filled with solids, the screens become plugged, the pressure drop across the screens and trapped solids increases, and the amount of slurry pumped by the feed pump diminishes rapidly. When the pressure drop across the screen cavity has risen to a high level, usually in excess of 100 to 200 pounds per square inch, a pressure switch is tripped to shut the pump off. The filter press is then opened and the solids trapped in the cavities fall out onto a conveyor belt. The feed lines are then blown clean with compressed air, the press closed, and the feed pump restarted to begin a new cycle. The time needed to fill, empty, and prepare the press for the next fill cycle is referred to as the press cycle time.

Filter presses are available in a wide variety of capacities and styles. The capacity of a truck mounted, portable press is usually in the range of 100-cubic feet (cf) and would be too small for a project of the magnitude considered herein. Larger presses, which must be assembled on site from component parts, are available, and presses that produce at least 200 cf of dewatered filter cake per cycle have been selected for this conceptual design. Experience has shown that these filter presses can generally produce a filter cake containing 60% solids, by weight, from a clay and silt slurry.

The amount of silt and clay that must be dewatered in a day, the solids content of the slurry, and the time required to fill, empty, and prepare a filter press for the next fill cycle are all important in determining the number of filter presses required for a particular project. The physical properties of the sediment in the Hudson River vary from nearly all sand and gravel to nearly all silt and clay, depending upon whether the sediment is found in a region of high stream velocity where only the heaviest particles will settle out or in a backwater area where silts and clays may be deposited.

As seen in the Productivity Standard volume, the mean clay content of all the samples analyzed by GE during the 2002 and 2003 sediment sampling program was 11.9%, while the mean silt content was 25.7%. The maximum clay content of any sample was 80%, while the maximum silt content measured in any sample was 84.9%. For conceptual design purposes, the filter presses have been sized to dewater sediment containing 80% silt and clay-sized particles, assuming a typical day when 6,800 cy of slurry arrive at the processing site unloading facilities. This is considerably above the silt and clay content found for the average sediment sample and is judged to be conservative, particularly since it is unlikely that eight dredges would all be operating simultaneously in areas where the silt and clay content are considerably above the mean for the river as a whole. This high silt and clay content gives rise to some particular problems as will be described below.

A typical day's delivery of 6,800 cy of sediment equates to a weight of solids in the sediment of approximately 10,201,550 lb/day, or 5,100 tons/day. The weight of water delivered would be 7,387,330 lb/typical day. Assuming that the slurry contains 80% silt and clay-sized solids and 20% sand and gravel, and that essentially all of the sand and gravel but none of the silt and clay are removed from the slurry in the hydrocyclone and screening tower, the slurry reaching the equalization basin will contain 0.80 X 10,201,550 lb = 8,161,240 lbs of solids.

Although the sand and gravel removed from the stream by the hydrocyclones and screens will contain some moisture, the amount of water diverted with the sand and gravel is considered negligible and has been ignored. Therefore, the silt and clay slurry will still contain essentially all of the water delivered in the scows, or close to 7,387,330 lbs, and the total weight of fine sediment slurry that will have to be processed in the filter presses will be 8,161,240 lbs solids + 7,387,330 lbs water = 15,548,570 lbs total. The solids content of this slurry in the equalization basin will be 8,161,240/15,548,570 = 52.5 %, assuming that the basin is not receiving a substantial amount of storm water runoff at the same time.

The conceptual design assumes that the solids content of the filter cake produced by the presses will be 60%. To achieve this, some water must be removed by the presses and sent on to the water treatment plant. If the solids content of the filter cake is 60% and equals 8,161,240 lbs of solids, the total weight of the filter cake is 13,602,067 lbs. The amount of water in the filter cake will be 5,440,827 lbs. Since the slurry sent to the presses contained 7,387,330 lbs of water, the water removed by the presses during this typical day would be 1,946,503 lbs.

While this estimate is simplistic, since it ignores the addition of some storm water, backwash water, and clarifier blow-down from the water treatment plant, water from decontamination procedures, and chemicals added to the slurry to condition it for dewatering, it is sufficiently close to what is expected to permit an estimate of the number of filter presses required. If the additional water and solids from extraneous sources were

accounted for, the amount of water sent on to the water treatment plant and the amount of filter cake produced would actually be somewhat greater.
In estimating the number of filter presses required to process the silt and clay sediments delivered to the site, the volume of filter cake produced must be estimated. As noted above, the filter cake contains an estimated 5,440,827 lbs of water. This is equivalent to approximately 87,193 cf. Assuming that the solids in the cake have a true specific gravity of 2.5 g/cc, or 156 lbs/cf, the volume of the silt and clay will be 52,316 cf and the volume of the filter cake will be the sum of the volumes of water and solids, or 139,509 cf.

In order to produce a volume of 139,509 cf of filter cake in one day using filter presses that produce only 200 cf per press cycle, approximately 698 press cycles will be required. GE is currently planning a number of treatability studies to determine the time required to complete a press cycle using different dewatering chemicals and the solids content of the filter cake, but this information is not available as yet. Therefore, for conceptual design purposes, a press cycle time of one hour has been estimated based on past experience with dewatering dredged sediments.

Assuming that each press can achieve 24 press cycles/day and produce 200 cf of filter cake per cycle, a single press will produce 4,800 cf of filter cake per day. To produce 139,509 cf of filter cake in one day, 29 filter presses of this capacity would be required. For conceptual design purposes, it has been assumed that 30 presses would be installed to provide capacity to dewater the extra solids contributed to the process by the addition of dewatering chemicals to the slurry, water treatment plant residuals, and solids contained in storm water runoff and decontamination procedures. If presses with a higher capacity were installed, or the cycle time can be reduced, the number of presses required would be less.

It should be noted that the estimate of the number of presses required has been made for a day during which 6,800 cy of slurry is unloaded from the scows and the sediment contains 80% silt and clay-sized particles. If, on the rare day when a maximum of 10,800 cuds of slurry might be delivered to the site and the slurry contained 80% silt and clay-sized particles, the presses would not be able to process all of the sediment. The excess sediment would be stored in the equalization basin until the following day when less slurry arrived for processing. As is noted above, the possibility that any day's dredging production will contain 80% silt and clay sized particles is very low, and it would be extremely unusual for this condition to exist on a day when 10,800 cy of slurry arrives for processing. In any event, the filter presses would operate seven days per week, while dredging would be done six days per week, so any accumulation of slurry in the equalization basin due to an occasional high production day should be eliminated by the end of each week.

Whenever the sediment arriving at the site for processing contains a high percentage of silt and clay, the percentage of the sediment that must be dewatered in the filter presses will be high. The geotechnical data indicate that, on most days, the sediment will contain less than 50% silt and clay and more than 50% sand and gravel. Since the sand and gravel will be removed at the hydrocyclone and screening tower, the slurry reaching the equalization basin will contain less solids and less use of the filter presses will be needed. A special problem that will arise on those days when the slurry contains a high percentage of silt and clay concerns the means of transferring the desanded slurry from the equalization basin to the chemical mixing tanks at the head of the filter press process. As noted in the preceding example, if the slurry contains 80% silt and clay, the solids content in the equalization basin will be approximately 52.5%. This is a thick slurry and will be difficult to pump. To transfer this slurry to chemical mixing tanks, the conceptual design employs a small hydraulic dredge with a pump capacity of approximately 1,500 gpm.

To avoid damaging the basin liner, a plain suction dredge or a horizontal auger dredge with the auger equipped with tires to prevent it from touching the liner would be required. This dredge would travel up and down the length of the basin on a cable and would operate automatically. However, the dredge might have difficulty pumping a slurry containing 52.5% solids, by weight, and it is anticipated that the slurry in the basin may have to be diluted somewhat by recycling water discharged from the filter presses to the basin (rather than sending it directly on to the water treatment plant) until such time as the solids content in the basin is reduced to more normal levels.

Since recycling cannot be continued for a long period of time without completely filling the equalization basin, this problem could conceivably create a bottleneck in the system that would force a reduction in the rate of dredging. When GE completes its review of the sediment sampling data from the 2002 and 2003 sampling program, identifies the areas to be dredged, evaluates the silt and clay content of each area, and develops a tentative schedule for the dredges working in each area, the significance of this potential problem should be evaluated further.

2.4 Water Treatment Plant

The conceptual design includes a 2.0 million gallons per day (MGD) water treatment plant to treat water from the dewatering operations and an estimated 400,000 gallons per day of storm water runoff during a one-inch rainstorm. It should be noted that a plant this size is adequate for mechanical dredging operations, where the slurry does not contain a large amount of entrained water. A plant for a hydraulic dredging operation would require six or eight times more capacity, but could be constructed with the same unit processes.

A typical water treatment plant used for dredging projects consists of a rapid mixing basin, flocculation chamber, settling basin, and mixed media filters to remove solids from the stream and granular activated carbon filters to remove dissolved PCB. Such plants can be purchased from the manufacturers of packaged water treatment systems or assembled from diverse components available for lease from a number of companies. The water treatment technology is well known and has been used on so many PCB contaminated sediment remediation projects that it will not be described further.

2.5 Site Area Requirements

As noted above, the docking and unloading facilities should include at least 1,200 ft of dock area along the river. In order to provide space for the hydraulic pump-out equipment, unloading occasional scow loads of debris removed from the river, and accessing the floating equipment at the dock, the dock should extend at least 75 ft back from the water's edge. Assuming dimensions of 1,200 ft by 75 ft, the dock area will occupy approximately 2.1 acres.

The hydrocyclone and screen tower will have a footprint of approximately 400 sq ft and will need an associated stock pile or container area to receive the sand and gravel removed from the slurry. A total area of approximately 100 by 150 ft, or 0.34 acres, is estimated for the tower and stockpile or container parking area.

The proposed equalization basin size was described in subsection 2.2.3 as requiring an area of approximately 1.5 acres. The area occupied by the filter presses, chemical storage, chemical mixing tanks, filter press feed tanks and filter press feed pumps is estimated at 1.3 acres, while a storage pad to receive the filter cake as it is dumped from the presses is estimated to occupy about 0.75 acres. The water treatment plant will occupy an area of approximately 0.25 acres.

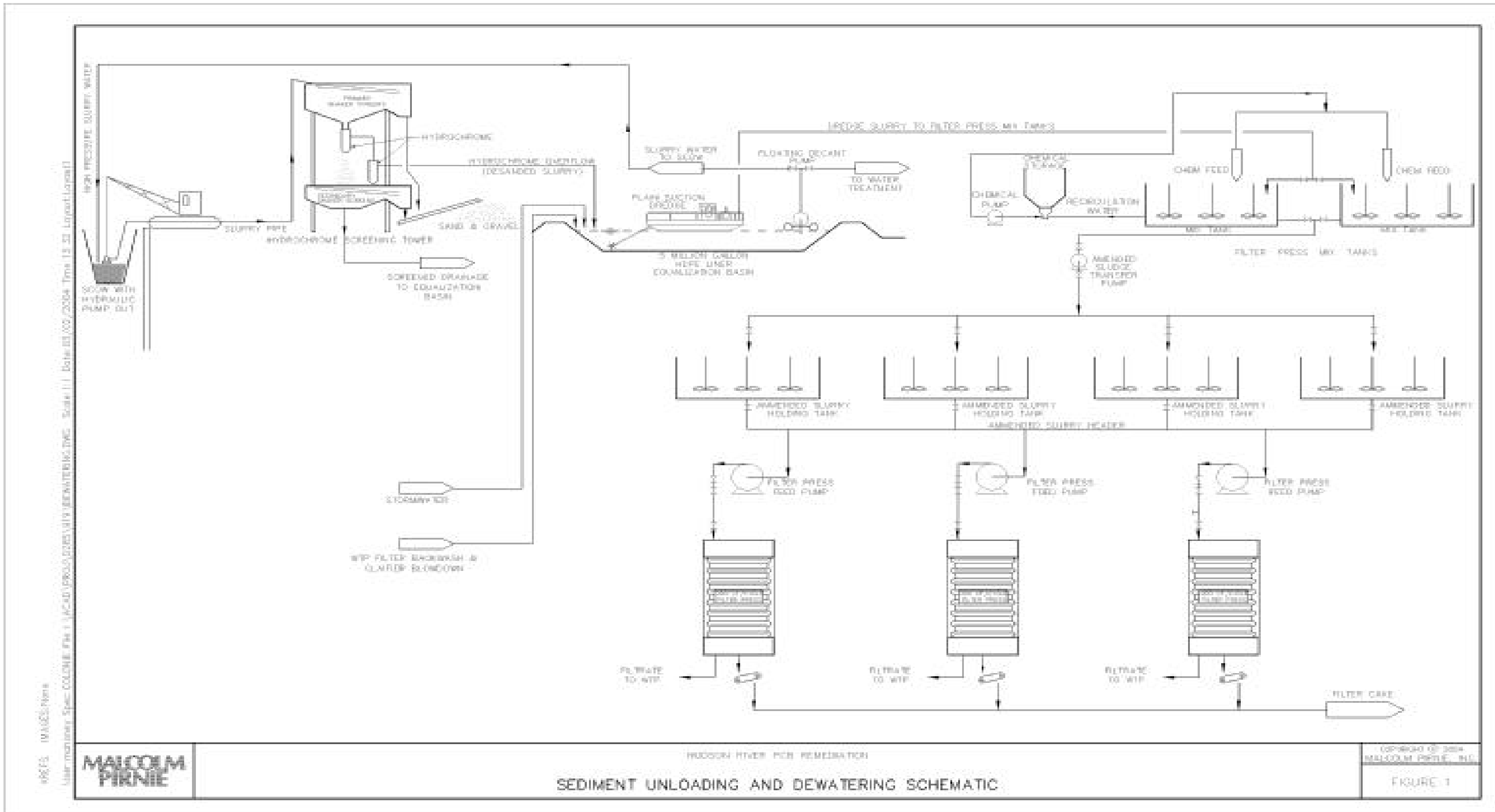
Office trailers and worker parking will be required on the site, although the area needed for parking could be reduced by off-site parking arrangements. Assuming that five office trailers will be located at the site and that parking space for up to 50 cars at one time would be provided, the area required for these facilities will be approximately 0.75 acres.

The largest area requirements are associated with the need to stockpile processed sediment for loading onto railcars or barges, and the railroad sidings needed to load rail cars, if that mode of transporting the sediment to an off-site disposal area is selected by GE. A stockpile capable of holding at least 20,000 cy of dewatered sediment should be available to provide for a steady loading rate. Such a stockpile, with sufficient room to maneuver loading equipment around it, would require about two acres and a larger area would be desirable. A railroad siding capable of holding up to 45 gondolas or container cars at a time is estimated to occupy nearly three acres, provided that the site topography does not require a large embankment or cut to install the siding.

A summary of the areas required for the various processing equipment, stockpiles, and ancillary uses is presented in the table below. As shown in this table, the total area required would be about 18 acres. The sites under consideration provide for at least this much area and most sites are considerably larger.

Table B-1
Summary of Area Requirements for Sediment Processing Site

Description	Area Required, Acres
Docking and Scow Unloading at River	2.1
Hydrocyclone and Screening Tower with Associated Storage Pad	3.4
Equalization Basin	1.5
Filter Presses and Associated Tankage	1.3
Filter Cake Storage Pad	0.75
Water Treatment Plant	0.25
Office Trailers and Worker Parking	0.75
Processed Sediment Stockpile Area	2.0
Rail Siding and Loading Equipment	3.0
Miscellaneous Pipelines, Lighting Poles, Roadways, Drainage Swales, etc.	3.0
Total Estimated Area	18.05 Acres


HUDSON RIVER PCB REMEDIATION
SEDIMENT UNLOADING AND DEWATERING SCHEMATIC
FIGURE 1
MALCOLM PIRNIE

Attachment C
Issues Associated with Processing Full Production Volumes at the Old Moreau Landfill Candidate Processing/Transfer Facility Site

1.0 Introduction

During preparation of the Feasibility Study (FS) and Responsiveness Summary (RS), consideration was given to the availability and capacity of sites for transferring and processing dredged sediments. The conclusion reached at that time was that it would be preferable to identify at least two transfer/processing sites so that both in-river transport difficulties and the scale of on-site operations would be reduced in comparison to the situation wherein only one site were available.

However, from the standpoint of demonstrating that the productivity standard can be attained, an analysis based on one operational transfer/processing site would be more conservative than an analysis based on two functioning sites. This is particularly the case if the transfer/processing site were to be situated at either the northern or southern limit of the upper Hudson remedial work zone.

The discussion that follows presents issues associated with processing and exporting 4,500 tons per day of stabilized or dewatered sediment from the Moreau site, which has been referred to, in the FS and RS as the northern transfer/processing facility. At 4,500 tons per day, the Moreau site would essentially be handling sediments at the average rate required by the performance standards developed herein. No assessment is provided for a southern transfer/processing site in the Port of Albany area since a single full-scale processing operation at that location would preclude use of hydraulic dredging technology, a potentially viable technology for removing targeted sediments in River Section 1.

At this time, the selection of transfer/processing site(s) has not been finalized. USEPA is following the site selection process as defined in the Facility Siting Concept Document (USEPA, December 2002).

2.0 Issues Considered

2.1 Site Area

As presented elsewhere in this report, a single site providing about 15 to 20 acres of usable area is required to transfer and process sediments at a rate that would meet the required average productivity performance standards (about 4,500 tons per day). The key issue here is that the area be usable and configured so that waterfront transfer and landside processing operations can be optimally situated in relationship to the site's rail load-out facilities. The required increase in site throughput, from approximately 1600 tons per day (as per the FS and RS for Moreau) to about 4,500 tons per day, increases the required usable site area by about one-third. However, the Moreau locale, which includes old Moreau landfill and additional properties south of the landfill, has adequate area to accommodate transfer/processing operations with a throughput of 4,500 tons pr day. A key issue here is the availability of the properties south of the old landfill.

2.2 Waterfront Requirements

As site throughput increases from about 1,600 tons per day to 4,500 tons per day, it becomes necessary to expand waterfront transfer capacity, particularly for the mechanical dredging alternative. Figure C-1 shows two active, hopper-barge unloading positions for 4,500 tons per day throughput whereas the FS and RS indicated that the northern transfer facility could function with one active barge unloading position (at 1,600 tons per day).

To accommodate two hopper barges, the site's wharf would be expanded to a length of approximately 400 feet, about 50 feet more than had been previously shown. In addition, operations at the waterfront appear to become somewhat more complex given the limited space within which barges can be maneuvered and the considerable time needed to remove (pump) excess water and unload dredged sediment. A detailed waterfront operational analysis is needed to fully evaluate reliable transfer of 4,500 tons per day.

2.3 Processing and Storage Facilities

Previous reports indicated that it would be beneficial to provide limited on-site storage for processed sediments to accommodate inconsistencies in rail operations (mechanical dredging) or rail and barging operations (hydraulic dredging). The scale of on-site storage would have to more than double should throughput be increased from 1,600 to 4,500 tons per day. Since it is expected that the primary storage facility would be enclosed to control fugitive dust, the cost associated with storage and materials reclamation (see next item) will increase significantly.

2.4 Materials Handling

It is anticipated that loading 4,500 tons per day of processed sediment into gondolas, would best be accomplished by a fully automated system using enclosed or covered conveyors. The FS and RS analysis assumed that dumpsters could be used, at Moreau, to haul material from the storage area to the on-site rail yard. Rail car loading would then be accomplished by front-end loaders. However, once handling requirements reach 4,500 tons per day, it is not likely that trucking will be found efficient. In addition, at 4,500 tons per day, the level of trucking activity, and associated air emissions, may prove to be unacceptable at Moreau. In order to provide a more thorough assessment of materials handling needs there, it would be necessary to perform additional, detailed engineering analyses.

2.5 Rail Yard

The scale of the on-site rail yard increases significantly when throughput is expanded from 1,600 tons per day to about 4,500 tons per day. The enclosed illustration shows the yard to consist of three tracks of adequate length to store up to 15 gondolas each. While it appears that the Moreau site has room for the yard on its upper terrace (the old Moreau landfill), a geotechnical evaluation will be needed to ascertain the stability of the old landfill in relationship to the load imposed by rail operations. Historically, a smaller rail yard had been situated on the old landfill and the scale of yard illustrated in the FS and RS was not altogether different than that former facility.

2.6 Rail Operations

At the FS and RS stage, USEPA had discussed Hudson Valley rail operations with the Canadian Pacific Railroad (CPR). The CPR indicated that they could pick up eight loaded rail cars twice each day and haul them to either the Ft. Edward or Saratoga yards for temporary storage while a full train (75 cars or more) of stabilized sediments is made-up. In order to move 4,500 tons per day out of Moreau, it will be necessary for the CPR to pick up (and drop off) 15 cars, three times each day and bring them to temporary storage at either yard location. As of this date input has not been obtained from the CPR as to whether or not they would have any difficulty in handling the expanded throughput of a single processing facility being situated at Moreau.

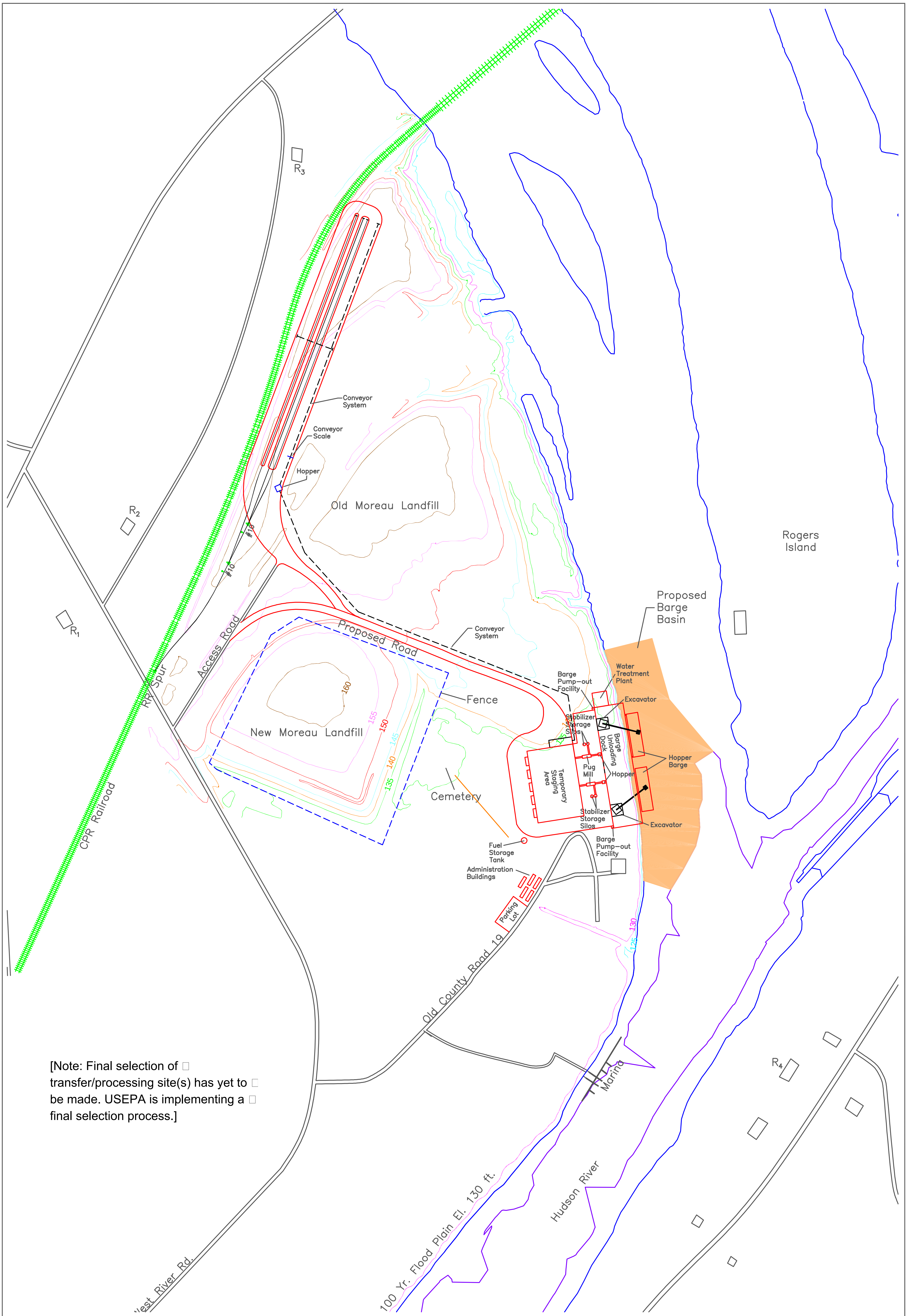
3.0 Summary

Adequate land area appears to be available at the Moreau site (northern transfer facility) to situate the facilities needed to transfer and process 4,500 tons per day of dredged sediments. However, it is unknown whether engineering and operational constraints will permit that scale of throughput there.

At the waterfront, management of several, sediment-laden barges simultaneously may prove a challenge to attaining the project's productivity goals. Barges have to be maneuvered within a relatively confined basin, tied up to the new wharf, and then undergo removal of excess water (by pumping). Operations at the waterfront have to be consistent with water quality criteria, a circumstance that may slow and, therefore, extend unloading operations.

Neither processing nor materials handling systems are expected to limit the ability to handle 4,500 tons per day at Moreau. However, the technologies that will be needed to do so are likely to be significantly more sophisticated than those described in the FS and RS. One advantage in using automated materials handling systems is that fugitive emissions can be better controlled than would be possible under a trucking alternative.

The viability of developing a rail yard to accommodate 4,500 tons per day output needs to be evaluated further from both geotechnical and operational perspectives. Ultimately, it will be necessary to discuss the increased level of operations with the CPR to ascertain the plausibility of moving 4,500 tons per day reliably from Moreau.



[Note: Final selection of transfer/processing site(s) has yet to be made. USEPA is implementing a final selection process.]

Hudson River PCB Site	Figure C-1	April 2004
	Northern Transfer Facility Layout for Mechanical Dredging Approximately 4500 Tons/Day Output	

Attachment D
Example Production Schedule

1.0 Example Production Schedule

In order to evaluate the feasibility of achieving the Productivity Standard, an example production schedule was prepared using Primavera SystemsÓ, Inc. project scheduling software. This production schedule is provided as a series of pullout sheets at the end of this attachment. It should be clearly understood that an actual production schedule will be developed during final design of the project and may be significantly different from this example.

In developing this example schedule, a large number of assumptions have been made that have an impact on dredging productivity. These assumptions are based on available information and, in some instances, are expected to change as the project is further developed during design. Where production rates have been assigned to particular aspects of the work, an attempt has been made to recognize the difficulty of the project and to be conservative in estimating the amount of work that can be accomplished in a given time period.

2.0 Assumptions Relating to Productivity

2.1 Locations and Volume of Sediment to be Dredged

A major assumption that affects the time required to dredge the Upper Hudson is related to the actual volume of sediment to be dredged and the depth of water in which these sediments are located. The delineation of sediment to be removed was taken from the Feasibility Study (FS) and was based on the analytical results for samples collected during a number of prior sampling events. The delineation may vary based on the outcome of General Electric's (GE's) sampling efforts, and the volume estimates will be adjusted accordingly.

Given the distribution of targeted sediments presented in the FS, a preliminary assessment has been performed of the practical working limits of the dredging technologies that appear to be relevant to remedial work in the Upper Hudson River. For a mechanical dredging system it was assumed it could function in proximity to the river shoreline in those areas where there would be at least 6 feet of water after dredging. Also, it was further assumed that a mechanical dredge could effectively reach and remove sediments lying 30 feet beyond its location in shallow water.

For a hydraulic dredging system is has been assumed that the system could successfully remove shoreline sediments where there would be as little as 3 feet of water in the post-dredging condition. Material not accessible by conventional mechanical and hydraulic technologies would have to be excavated by alternative specialty dredging systems.

2.1.1 River Section 1

In River Section 1 (River Mile 188.5 upstream to the area around Rogers Island), a total of approximately 1.56 million cy of sediment will be removed. Approximately 1.25 million cy (about 80 percent) of this material could be removed using a mechanical dredge, while a hydraulic dredge could remove 1.39 million cy (about 89 percent). An alternative dredge, capable of working in shallow water, would be required for the remaining material (approximately 20 percent, or 0.31 million cy, for mechanical dredging and 11 percent, or 0.17 million cy, for hydraulic dredging).

2.1.2 River Section 2

In River Section 2 (River Mile 183.24 to River Mile 188.5), approximately 0.50 million cy of sediment will be removed. Approximately 0.48 million cy, or 95 percent of this material, can be removed using either a mechanical or hydraulic dredge. The remainder would have to be dredged using equipment capable of working in shallow water.

2.1.3 River Section 3

For River Section 3 (River Mile 163.25 to 170.25), approximately 0.56 million cy of sediment will be removed. Of this, approximately 0.37 million cy (about 65 percent) can be removed using a mechanical dredge, with the remaining 0.20 million cy (35 percent) removed by an alternative dredge. The entire 0.56 million cy of the material can be removed using a hydraulic dredge if processing and shipping sites are available within pumping distance of the dredge.

A summary of dredge volumes (cyds) by location and method is provided in Table D-1 and in Tables F-1A and F-1B in Attachment F.

2.2 Location of Processing Facilities

The Record of Decision (ROD) assumed the establishment of two processing facilities, one near the northern extent of the project area and one near the southern extent of the project area. However, for the purpose of a conservative production estimate, it was assumed that only one facility would be available at the northern end of the project River Mile 194 on or near the Old Moreau Landfill or New Moreau Landfill. Under this assumption, all dredged sediments will have to be delivered to this one site for processing and shipping. The location was selected near the majority of dredging (in River Section 1). This selection does not suggest that United States Environmental Protection Agency (USEPA) has selected this location or that the location is considered preferable. Facility siting will be conducted in accordance with the procedures set forth in Facility Siting, Concept Document (USEPA, 2002).

2.3 Need for Silt Barriers/Curtains

Silt barriers/curtains are most appropriate in water depths less than 21 feet and flow velocities less than 1.5 feet per second. For the purpose of the example production schedule development, it was assumed that silt barriers would be used for all dredging work outside of the navigation channel. This assumption was made so that a conservative, if not worse case, scenario could be developed to estimate productivity. The need for silt barriers/curtains should be determined during the design phase. The silt barrier type selected for preparation of the schedule presented herein consists of steel sheet piling at the upstream and downstream limit of the active work area. In shallow water areas, Jersey barrier or a similar portable barrier may be used.

The steel sheeting would extend perpendicularly from the high water mark on the shoreline to the navigation channel or the limits of the active work area. The sheeting would then be installed parallel to the river channel and extended an additional 30 to 50 feet. The steel sheeting on the upstream end of the active work area would extend in a downstream direction and the steel sheeting on the downstream end of the active work area would extend in an upstream direction.

High-density polyethylene (HDPE) geomembrane would be installed between the ends of the sheet piling. The HDPE sheeting would be supported at the top by a floatation boom and anchored or weighted to the riverbed to hold it in position. A sketch of an assumed silt barrier installation is presented in Figure D-1. This type of barrier differs from the conventional silt curtain in that its mode of failure is through submergence of the floatation boom rather than a lifting of the bottom of the curtain in response to pressure waves.

2.4 Dredging Procedure

In developing tentative dredge production rates, it has been assumed that, where the thickness of the sediment layer exceeds 2 feet for hydraulic dredging or 1 foot for mechanical dredging, multiple passes of the dredge will be required to achieve the target removal depth, referred to herein as the “design cut.” By removing the sediment in two or more passes, taking shallow cuts each time rather than dredging to the design depth at one setup of the dredge, contaminated material that sloughs from the face of the cut during the first pass of the dredge will be excavated on the second pass. This reduces, but does not eliminate, the potential for contaminating the surface of the riverbed exposed by the dredge with contaminated material from above. Under this assumption, the dredge will make passes covering at least an acre before returning to begin another pass or passes as needed to achieve the design cut.

2.5 Need for Redredging

Regardless of the dredging technology that is used, it should be assumed that some redredging would be required to achieve target cleanup levels in some areas of the river. It is very difficult to estimate the potential time required to redredge areas that do not achieve the performance standard for residuals after initial dredging. The *Project Completion Report* on remediation of the St. Lawrence River at the former Reynolds Metals site indicates that about 50 percent of the areas targeted for dredging achieved the target cleanup level of 1.0 mg/kg during initial dredging. A first attempt at redredging succeeded in achieving cleanup targets in an additional 30 percent of the areas, while two redredging attempts were needed to raise the total to 88 percent. Some areas were redredged 3 or more times and failed to meet the cleanup requirements. Ultimately, it was necessary to change the dredging method to achieve the target cleanup level in some areas with rocky and/or compacted till underlying the sediment (See *Volume 5, Appendix: Case Studies of Environmental Dredging Projects*).

Satisfactory completion of the initial dredging to achieve the design cut and remediation goals will be determined based on the requirements set forth in the Residuals Standard. For the purposes of this productivity estimate, it has been assumed that redredging will require 50 percent of the time required to dredge to the design elevation, *i.e.* if 30 days are required to dredge a given subarea to the design elevation, an additional 15 days will be needed to redredge portions of this area to meet the target cleanup level. The validity of this assumption will be tested during Phase 1 of the project, provided that some areas require a second attempt at dredging during Phase 1.

In order to evaluate whether the 50 percent time allowance for redredging included in the example production schedule is reasonable, however, an analysis was undertaken of the time needed to make a complete dredging pass over a given area under the assumption that the depth of cut during that pass would be about 6 inches. Since most environmental buckets are designed such that the bucket jaws open wide enough to completely fill the bucket at a depth of cut of about 1 foot, the area of the river bottom encompassed by the open jaws can be estimated. For example, a 4-cy bucket designed to remove a layer 1 foot deep would cover a "footprint" of 108 square feet (sq ft) with the jaws wide open (108-sq-ft X 1-ft depth = 108 cubic feet = 4 cy).

2.5.1 Assumptions

To prepare this analysis, the following assumptions have been made:

- Dredges to be used for re-dredging in areas with 6 feet or more of water depth would have a 4-cy hydraulically activated environmental horizontal profiler bucket. A dredge with a 2-cy hydraulically activated environmental horizontal profiler bucket would be used where redredging must be done in water depths of less than 6 feet.

- The 4-cy bucket has an area footprint of 108 sq ft per cut when fully open. The 2-cy bucket has an area footprint of 56 sq ft when fully open.

- The 4-cy dredge will have an average operating time of 23 cycles per hour while the 2-cy dredge will operate at 15 cycles per hour. The longer cycle time has been assumed for the 2-cy dredge because it has been assumed that this dredge will be working along the shoreline and around docks, walls, and other obstructions that may slow the production process.

- Each cycle will overlap the area covered by the previous cycles by 20 percent (based on conversations with Bean Environmental).

- Since 20 percent of each cycle is used to overlap the area covered by previous cycles, 64 percent of new ground is covered per cycle. (0.8 length X 0.8 width = 0.64)
- A dredge operates 13 hours at full production per day consistent with the assumption used to develop the Productivity Standard.

2.5.2 Calculations

Using these assumptions, the rate of area coverage for redredging is determined to be approximately 27 dredge hours per acre for a 4-cy bucket and approximately 81 dredge hours per acre for a 2-cy dredge bucket. Applying the assumed factor of 13 full production hours per day, a 4-cy dredge will require 2.1 dredge days to dredge 1 acre, while a 2-cy dredge will require 6.2 days.

An example redredging calculation for a 4-cy dredge is shown as follows. The calculation for a 2-cyd dredge would be similar and would yield 6.2 days to cover an acre.

(108 sq ft) (0.64) = 69.1 sq ft/cycle
(23 cycles/hr) (69.1 sq ft/cycle) = 1,589 sq ft/hr
(43,560 sq ft/acre)/(1589 sq ft/hr) = 27.4 hr/acre
(27.4 hr/acre) / (13 hr/day) = 2.1 days/acre

The rate of area coverage during production dredging to reach the design cut lines can be calculated using the following assumptions:

- Dredges with a 4-cy bucket have an assumed volumetric production rate of 82 cy per hour, while 2-cyd dredges have an assumed production rate of 27 cy per hour.

- Design cuts will average 3 feet deep, the average depth of contaminated sediment as reported in the FS.

- A 4-cy dredge will have an operating time of 23 cycles per hour (2.6 minutes per cycle), while a 2-cy dredge will have an operating time of 15 cycles per hour (4.0 minutes per cycle).

Using these assumptions, a 4-cy dredge will require approximately 59 dredge hours per acre, or 4.5 dredge days per acre, to remove a 3-foot-thick layer of sediment as shown below.

(43,560 sq ft/acre) (3-ft cut depth) = (130,680 cubic feet [cu ft]/acre)
(82 cy/hr) (27 cu ft/cy) = 2,214 cu ft/hr
(130,680 cu ft/acre)/(2,214 cu ft/hr) = 59 hr/acre
(59 hr/acre)/(13 hr/day) = 4.5 days/acre

A 2-cy dredge operating at a production rate of 27 cy per hour would require 179 hours per acre or 13.8 dredge days per acre.

Based on the case studies described previously, it has been assumed that, on average, approximately 50 percent of an area targeted for dredging will fail to meet the target cleanup standard of 1 milligram per kilogram (mg/kg) Tri-plus PCBs in the 6-inch residual layer and will require redredging. It is further assumed that the first redredging attempt will achieve the target in 50 percent of the area redredged and that a second attempt will be required to meet the target in the area that failed. Since the Residuals Standard limits the number of re-dredging passes to two, the estimated total time spent on redredging for a hypothetical 1-acre area using a 4-cy dredge is shown below.

Total area dredged:	1 acre
Area requiring redredging:	0.5 acre
Time required for first redredging attempt:	(0.5 acre) (2.1 days/acre) = 1.05 days
Area requiring second redredging attempt:	0.25 acre
Time required for second redredging attempt:	(.25 acre) (2.1 days/acre) = 0.53 days
Total redredging time:	1.05 days + 0.53 days = 1.58 days
Percentage of redredging days to original production dredging days:	(1.58 days/4.5 days) (100) = 35 percent

A similar calculation can be made for redredging using a 2-cy bucket.

Total area dredged:	1.0 acre
Area requiring redredging:	0.5 acre
Time required for first redredging attempt:	(0.5 acre) (6.2 days/acre) = 3.1 days
Area requiring second redredging attempt:	0.25 acre
Time required for second redredging attempt:	(0.25 acre) (6.2 days/acre) = 1.55 days
Total redredging time:	3.1 days + 1.55 days = 4.65 days
Percentage of redredging days to original production dredging days:	(4.65 days/13.8 days) (100) = 34 percent

Inasmuch as the length of time needed to redredge an acre is shown in the above calculations to be around 35 percent of the time needed to dredge to the original design cut lines, the allowance of 50 percent used for the example production schedule appears to be reasonable, if not somewhat conservative. It should be noted, however, that the need for re-dredging all or part of an area and the time required to complete a maximum of two re-dredging attempts will be influenced by a large number of variables and experience gained during Phase 1 should be the real test of the reasonableness of this allowance.

2.6 Redredging Sensitivity Analysis

In order to determine the effect that redredging would have on total project duration, a sensitivity analysis was performed that compared three different scenarios to the example production schedule. The example production schedule was developed based on the assumption that redredging would take 50% of the number of dredge days. The three scenarios assumed that redredging would take 25%, 75%, or 100% of the total number of dredge days required to achieve the design cuts established for a given site. The duration of the 25% and 50% scenarios is equal, since it is assumed that redredging cannot finish earlier than ten working days after the completion of design dredging to allow for post-dredge surveying, confirmatory sampling, and completion of redredging. The duration of the 75% and 100% scenarios are 0.6 and 1.7 years longer, respectively, than the 6-year duration presented in the example production schedule, assuming that additional dredges are not added to the redredging effort.

2.7 Wetland Restoration

To estimate the effort associated with wetland restoration, it has been assumed that following dredging activities, those areas identified as wetlands will be backfilled with a mixture of sand and fine material to achieve a water depth approximately equal to the pre-dredging depth. These areas will then be planted with appropriate wetland vegetation.

2.8 Weather and River Flow Issues

Low temperatures, high winds, and high flow rates or flooding may occur during the dredging season. Based on meteorological data from the Glens Falls (Warren County) and Albany Airports for the years 1991 through 2000, it appears that low temperatures should not limit work during the proposed period. In fact, based on temperature data alone, it would appear that productive work could occur for 33 to 34 weeks per construction season (RS, White Paper #313398).

The Upper Hudson River is relatively sheltered compared to a bay or a sound, and is not prone to wave formation. It is not expected that significant wind-related delays will occur.

Between 1997 and 2001, the Canal Corporation issued one Memo to Mariners indicating that the canal system between Lock C-1 and Lock C-4 would be closed for a few days until water levels receded to safer levels and debris could be removed. Based on estimated river velocities and associated water depths, it has been assumed that dredging activities can be effectively conducted in river flows up to 10,000 cubic feet per second (cfs) as measured at Fort Edward. Based on flow data collected at the USGS Fort Edward gauging station from 1978 to 2000, river flows in excess of 10,000 cfs occur approximately 5 percent of the time during the proposed dredging season (Responsiveness Summary (RS), White Paper #313398).

2.9 Canal Operating Schedule

The canal operates approximately 29 weeks per year and generally has daily limits on passage through the Champlain Canal lock system. It has been assumed that the Canal Corporation will extend their operating season to provide a minimum of 30 weeks per year (and possibly longer during mild years) and that 24-hour-per-day access through the locks will be provided to allow loaded and empty scows to navigate the system. It is further assumed that working within a pool between locks will be permitted even after the canal is closed to normal traffic in the fall (RS, White Paper #313398).

The Canal Corporation conducts most major rehabilitation and repair activities on the lock system during the winter months to avoid impeding boat traffic. Repairs, largely limited to above-water work, are performed on a maintenance cycle throughout the operating season of the canal. These repairs are not expected to inhibit travel. It is expected that the only repairs or maintenance activities that may inhibit use of the lock system would be emergency repairs, which have typically been very few. In addition, periodic events such as boat parades and land-based emergencies may also impede navigation.

2.10 Equipment-Related Delays

Some level of downtime due to equipment malfunction is unavoidable. However, the duration of the downtime and the affect on the overall schedule can be largely overcome through proper planning and design. For the purpose of this productivity assessment, the production hours (effective time) for the most critical mechanical equipment (e.g., dredging equipment) have been de-rated to account for typical downtime (for further information see RS White Paper #313398).

2.11 Processing and Shipping Assumptions

It has been assumed that the on-shore treatment and shipping facilities will be designed with adequate capacity to process the maximum daily output from the dredges. No separate allowance for additional lost production has been made for breakdowns in the scow unloading or sediment processing facilities. Lost dredging time resulting from downtime at the on-shore processing site is accounted for in the assumption that the effective dredging production will only be 13 hours per day.

2.12 Sequence of the Work

In order to identify the major pieces of equipment needed to complete the project and develop a preliminary schedule to evaluate the feasibility of remediating the river within the time frame defined in the ROD, a plan must be developed regarding the sequence of work. The following sequence of work has been assumed for the full-scale dredging program. Only the major, definable features of the work are listed, as these features generally control the overall production schedule. For the purposes of this example schedule, it has been assumed that turbidity barriers will be installed around each dredging area, as this is a time consuming operation and will result in a conservative estimate of the amount of work that can be accomplished each season. If turbidity barriers are not used on the project and the equipment selected for dredging is capable of being operated in conformance with the Resuspension Standard for, it should be possible to shorten the schedule.

- It has been assumed that mobilization will begin as soon as weather permits each spring, usually by the first week of April, and will concentrate on making the on-shore facilities ready for the dredging season. Dredges that were demobilized and removed from the site the previous winter will be mobilized on the first day that the canal opens in May.

- The installation of turbidity barriers, if used, and monitoring equipment will begin as soon as flows in the river permit. It is assumed that equipment needed to install these structures will have been trucked to the site prior to the opening of the canal, and installation is assumed to start on or about the first of May each year. A gate will be constructed in any barrier around each major work area. Installation of a turbidity barrier around the next area designated for dredging will be done while the first area is being dredged.

- Where hydraulic dredging is proposed, dredge pipe will be installed as the turbidity barrier is being constructed so that the necessary penetration of the barrier can be made. The pipe will be submerged where it crosses the navigation channel or obstructs private docks and marinas but will be floating or laid in shallow water along the riverbank in most other areas.

- Clearing and snagging fallen trees from the waters edge will be accomplished at the same time the turbidity barrier is installed so that dredging will not be delayed by this work.

- Dredging will begin within one to two days of the arrival of the dredges on the site and will continue until the area enclosed by the turbidity barrier is dredged to the design elevations. Unless post-dredging sampling indicates that the production dredges will be required for redredging portions of the area that did not meet the residuals standards, they will move immediately to the next area designated for dredging.

- Soundings will be taken at least weekly to confirm that the design elevations are being met as dredging proceeds in a given area. When a sufficient area is dredged to the design elevations, samples will be collected and analyzed for residual PCBs. Sampling should be done while the dredges are still working in an area and should follow the dredges by no more than a week.

- The dredging will be divided into certification units for sampling of residuals. If redredging is required in a certification unit, but sampling indicates that it should consist of a very shallow cut or of removing a very limited amount of residual sediment overlying clean sediment, or from a small portion of the acceptance area, the production dredges will move to the next acceptance area to be dredged and a smaller, alternative dredge will be employed for the redredging effort. It has been assumed that redredging will begin as soon as the need for it is identified in a certification unit rather than after an entire river reach has been completely dredged to the design elevations and all sampling has been completed in the large reach area.

- Soundings will be taken as redredging proceeds in an area, and a second round of post-dredging samples will be collected as soon as the dredge completes a defined area.

- Backfilling and shoreline stabilization will begin as soon as a portion of a work area has been determined to meet cleanup levels and generally while the production dredges are still working in the area. The example production schedule assumes that the backfill and shoreline stabilization work will be isolated from the dredging effort by conventional silt curtains installed within the overall area surrounded by the turbidity barrier.

- As soon as a work area has been completely backfilled and shoreline stabilization work has been completed, removal of the turbidity barrier surrounding that work area will begin.

- As the dredging season draws to a close, dredging will cease in time to permit backfilling and shoreline stabilization work to be completed in all areas dredged prior to demobilization for the winter.

- Unless there is a specific reason for leaving a particular section of silt barrier in place over the winter and it can be shown that the barrier can withstand the spring runoff and ice movement, all silt barriers will be removed from the river at the end of each dredging season.

- It has been assumed that demobilization of major pieces of dredging equipment that cannot be moved by truck will be moved out of the area on the last possible day of the canal operating season but that smaller dredges and work boats that can be transported by truck will remain on the site to complete any required work such as completing backfill and shoreline stabilization work, removing turbidity barriers, and dismantling dredge pipe for storage on site for the following year's work. It has also been assumed that demobilizing and winterizing on-shore treatment and shipping facilities will occur after the canal has closed for the season.

3.0 Selection of Equipment and Estimates of Production Rates

3.1 Silt Barrier Installation and Removal

Equipment required to install and remove the turbidity barrier consists of a workboat with a flat deck at least 100 feet long, equipped with a light crane for handling the HDPE barrier material. A hydraulic excavator type machine similar to a Caterpillar 350 Materials Handler would be mounted on a deck barge and equipped with a vibratory hammer or pile driver for installing steel sheet piling. The assumed production rate for this work is as follows:

- Installing sheet piling - 90 linear feet per day of wall per crew
- Installing HDPE barrier - 200 linear feet of barrier per day per crew
- Removing sheet piling - 130 linear feet per day per crew
- Removing HDPE barrier - 300 linear feet per day per crew

3.2 Mechanical Dredging

Two different size mechanical dredges have been selected for use wherever the water depth is great enough to permit access for scows. These are the same dredges as described in the FS (Appendix E-1) and are as follows:

- A dredge consisting of a hydraulic excavator with an extended boom and fitted with a 4-cy hydraulically actuated horizontal profiler bucket. The assumed effective production rate of this piece of equipment is 82 cy per hour.

- A dredge consisting of a hydraulic excavator with an extended boom and fitted with a 2-cyd hydraulically actuated horizontal profiler bucket. The assumed effective production rate of this piece of equipment is 27 cy per hour.

3.3 Hydraulic Dredging

The hydraulic dredge selected for evaluation is the same dredge described in the FS (Appendix H-1) and consists of a 12-inch cutterhead dredge with a 600-horsepower (HP) pump, 200 HP auxiliaries, and 900 HP booster pumps where required. Typically, a dredge of this size has a capacity of from 400 to 575 cy per hour, depending upon the distance pumped and whether it is pumping sand and gravel or silt and clay sediments. However, because dredging contaminated sediments requires careful attention to cut depths and location, resuspension of sediments other special issues, it has been assumed that the effective production rate for this dredge would be from 260 to 275 cy per hour, depending upon the type of sediment and distance pumped.

3.4 Alternative Dredging Equipment

Alternative dredging equipment will be required for use:

- In areas where the post-dredging water depth is less than about 3 feet.
- For redredging areas where post-dredging diver inspections and/or sampling indicate that a very shallow layer of sediment must still be removed.
- Where sediment remains in pockets in bedrock or is surrounded by boulders or other obstructions.

Two types of equipment have been considered: an amphibious, hydraulic excavator with a hydraulically actuated, horizontal profiler bucket with a capacity of about 1 cy, and a small, probably 8- or 10-inch, hydraulic dredge fitted with a cleanup dredge head or a plain suction mouth for cleanup work.

The amphibious excavator would be used in conjunction with a scow with a capacity of from 500 to 1000 cy and a draft, when empty, of less than 1 foot. The scow would be equipped with a hopper containing a screen to remove debris and would be towed into the shallow water and loaded with the hydraulic excavator until it sits on the river bottom. It would be unloaded in place using a Toyo Pump that would transfer the sediment to a second scow located in the navigation channel, which would in turn carry the sediment to the on-shore processing facility. Alternatively, mechanical dredges that utilize a hopper and hydraulic dredge pump to transfer mechanically dredged sediments to a scow located in deep water could be used. This equipment typically incorporates specific gravity loops with provisions for adjusting the water content of the slurry as needed.

Small hydraulic dredges fitted with cleanup dredge heads have been used to remove unconsolidated sediment deposits with high, *in situ* moisture contents. These dredges are capable of effective production rates in the 100 to 120 cy per hour range but would probably average no more than 40 to 60 cy per hour under difficult dredging conditions or when used to redredge an area where the layer of sediment to be removed is less than one foot.

Hydraulic dredges usually do not operate continuously for extended periods of time. Some downtime, usually on the order of 8 hours per week, is necessary for routine maintenance. It is also necessary to stop dredging to add slurry pipeline and booster pumping units as the equipment moves down the river, to remove debris that has become lodged in the intake, to relocate the dredge from one work area to another, and or for other reasons. Accordingly, an allowance must be made for the time that the dredge is not actively removing sediment.

In preparing the example production schedule, it has been assumed that dredging will be permitted 24 hours per day, six days per week and that routine weekly maintenance on the equipment will be accomplished on Sundays. Thus, the total time available for dredging would be 24 hours per day times 6 days per week, or 144 hours per week. The length of the dredging season has been assumed to be 30 weeks, so the total available time for dredging over the entire season would be 30 weeks at 144 hours per week, or 4,320 hours per year.

In order to meet the Productivity Standard of 490,000 cy per year during Phase 2 of the project, a single production dredge working at a reduced rate of 260 cy per hour would have to operate for 1,884 hours out of the 4,320 hours available, or about 44 percent of the total available time. To meet a target removal of 530,000 cy in a year, the dredge would have to operate effectively for 2038 hours per year, or about 47 percent of the time. In actuality, with one “production” hydraulic dredge operating at about 260 cy per hour and one alternative hydraulic dredge operating at about 50 cy per hour, the two dredges would only have to operate about 37 percent of the time to meet the 490,000-cyd-per-year dredging productivity standard and 40 percent of the time to meet the 530,000-cy-per-year target productivity rate.

3.5 Backfilling

Two methods of placing backfill have been considered: mechanical placement using a clamshell bucket on a crane, and hydraulic placement with a sand spreader. Placement of backfill with a clamshell bucket has been demonstrated to be feasible at the Grasse River near Massena, New York, and achieved a production rate of approximately 1200 sq ft of coverage per hour for a 1-foot lift of backfill. The material was brought to the work area by barge and spread with a 2.5-cy clamshell bucket on a crane. The crane boom was moved to spread the material as the bucket was opened and produced a cap varying in thickness from about 6 to 18 inches, with an average thickness of 1 foot. Use of WINOPS global positioning system (GPS) equipment to identify the location of each bucket full of soil placed assisted in attaining complete coverage of the river bottom. Proper placement of the backfill material at a reasonable production rate was highly dependent upon the skill of the crane operator.

Hydraulic equipment especially designed to spread backfill or capping material over a dredged bottom is available and has been used successfully on a number of projects. Typically, this equipment consists of a dredge pump to pump a sand slurry from a scow or a shoreline materials preparation area, dredge pipeline from the dredge pump to the spreader barge, and a spreading device mounted on a deck barge. The backfill material is hauled to the site in a barge or placed in a basin on shore close to the area to be backfilled. River water is pumped through high-pressure nozzles located at the dredge pump suction intake to create a slurry, and the slurry is pumped through a pipeline to the spreader.

The spreader consists of a deck barge with a spreader pipes arrayed like fingers on a hand and connected to a splitter box. The slurry of backfill material is pumped into the splitter box and flows out through the spreader pipes. The spreader pipes protrude over the end of the deck barge and discharge below the water surface as the spreader barge is slowly moved over the area to be backfilled. Hydraulic spreaders are easily capable of placing sand or a silt-sand mixture of backfill at effective production rates in the 250-cy-per-hour range and can cover over an acre per day or more with a 1-foot thick layer of backfill.

For the purposes of this document, it has been assumed that the river bottom can be backfilled at an effective production rate of 1.0 acres per day and 0.5 acres per day for critical backfill areas. It has also been assumed that backfilling will begin as soon as work in a certification unit has been determined to be complete.

4.0 Conceptual Production Schedule

Utilizing the production rates developed and presented above, an example production schedule has been developed for the mechanical dredging option using Primavera Systems©, Inc. software. This example schedule portrays the conceptual sequence and duration of one possible approach. The mechanical dredging option was selected for use in preparing a schedule because mechanical dredging is typically a slower process, and therefore more conservative, than hydraulic dredging. To verify the assumption that mechanical dredging is the slower option, a schedule of similar level of detail was developed that incorporates hydraulic dredges for use in River Section 1 only, and mechanical dredges in all other river sections and any areas in River Section 1 that contain boulders or excessive debris. Further, this example schedule was developed under the assumption that there would be only one processing site and that it would be located at the northerly limit of the Thompson Island Pool.

The results of this analysis indicated that hydraulic dredging (including the additional effort of installing/removing dredge pipeline) is significantly faster than mechanical dredging, thus verifying the assumption. This holds true until distances from the dredge to the processing facility approach about five miles, the approximate distance from the Thompson Island Dam to the assumed processing site at the northerly end of the Thompson Island Pool.

This example production schedule is provided as a series of pullout sheets at the end of this attachment. Attachment E contains the production schedule backup, including estimates of volumes of sediment to be dredged mechanically, by phase and river mile, site preparation quantities, and site restoration (backfill) quantities, and maps of each one-mile reach of the river. Attachment F contains the estimated volumes of sediment to be dredged, by river mile, whether the sediment consists of cohesive or non-cohesive soil, and information on pre- and post-dredging water depths, together with maps of each one-mile reach of the river.

Information on water depths, types of sediment, probable volumes to be dredged, etc, are all preliminary in nature and must be confirmed as part of the design. However, this information is judged to be accurate enough to support the development of an example schedule that illustrates the feasibility of completing the project in the time frame defined by the ROD. While changes in the percentage of cohesive or non-cohesive sediment, for instance, will affect the design of the sediment processing facility, they will have a relatively minor effect on the rate at which the sediment can be dredged.

Table D-2 summarizes the seasonal activities that would be completed if the project were implemented as shown on the example production schedule. The dredging work generally proceeds from upstream to downstream, and the work would be completed in six construction seasons. The volume remediated includes all targeted remediation and navigational dredging areas. The area remediated includes both standard and critical backfill areas. Critical backfill areas are defined as wetland areas that require additional backfill. These areas will take longer to backfill due to their sensitive nature.

The dredging completion date reflects the date when all dredging activities (including redredging after confirmatory sampling) would be completed. The work completion date reflects the time needed after dredging completion to complete site restoration activities (backfilling, post backfill surveying, obstruction replacement, shoreline stabilization, and containment removal) and all demobilization activities.

Table D-3 shows the amounts of dredging that would be completed during Phase 1 broken down by different river conditions, taken from the example production schedule. Of the 268,980 cy assumed to be dredged during Phase 1, about 246,065 cy could be accomplished with the 2-cyd and 4-cy mechanical dredges devoted to production work. Approximately 22,910 cy are located in shallow areas where alternative dredging equipment would be required. About 80,370 cy of the “production” dredging is located in the navigation channel of the canal. The amount completed during Phase 1 in the example production schedule exceeds the 200,000 cy established as the productivity standard for Phase 1.

Table D-4 presents the overall performance as shown in the example production schedule. The cumulative volume shown in the example production schedule exceeds the target cumulative volume requirement for both phases of dredging. The cumulative volumes presented in Table D-4 include remediation and navigational dredging areas.

The key assumptions and parameters used in developing the example production schedule are as follows:

- All three river sections (R1, R2, & R3), (total estimated volume of 2.65 million cy, covering approximately 40 miles) are presented in the example production schedule.
- Mechanical dredging scenario is presented in the production schedule.
- Dredging activities will generally proceed from upstream to downstream.
- Where possible, contiguous dredge certification units are dredged sequentially.
- Phase 1 will be completed during the first season.
- The dredging crews must achieve the full production dredging rate for at least a 30-day period by end of the Phase 1 season (min 200,000 cy, dredging starting late ~ mid June 2006).
- Phase 2 will be completed during years 2 through 6 (min 490,000 cy/year, work season from May 1 - Nov 30, 2007 to 2011).
- Dredging work will be done six working days/week, and at least 13 hours of dredging can be achieved during a work day when dredging is taking place.

- Winterization of equipment can begin ten days after completion of season's dredging.

- The production rate for critical area backfilling (1/2 acre/day) is based on half of the production rate for general backfill areas (1 acre/day) due to additional time needed for shallow backfill areas and preparation time for future shoreline planting.

- The same crew(s) used for containment barrier placement will be used for containment barrier removal.

- Different crews will be used for shoreline stabilization/restoration tasks: backfilling, shoreline stabilization, and containment removal.

Production rate assumptions for site preparation, mechanical dredging, and site restoration activities are presented in Table D-5. These rates were used in the critical path schedule for each dredge certification unit. Depending on scheduling, work can be performed on more than one certification unit at a time; therefore the number of crews needed for site preparation, dredging, and site restoration activities can vary at any one point in the schedule (the average number of crews is presented in the key assumptions). Production rates based on linear footage of shoreline and shoreline obstacles were based on the figures presented in Attachment E.

Table D-1
Hydraulic and Mechanical Dredge Volumes by Location

River Section	Mechanical Dredge					Hydraulic Dredge				
	4-cy Dredge		2-cy Dredge		Total	Main Production Dredge		Small, Cleanup Dredge		Total
1	1,256,000	(80%)	309,000	(20%)	1,565,000	1,390,000	(89%)	174,000	(11%)	1,564,000
2	475,000	(95%)	27,000	(5%)	502,000	480,000	(96%)	22,000	(4%)	502,000
3	366,000	(65%)	196,000	(35%)	562,000	562,000	(100%)	0	(0%)	562,000
Total	2,097,000	(80%)	532,000	(20%)	2,629,000	2,432,000	(93%)	196,000	(7%)	2,628,000

* Total volumes may not equal across dredging methods due to operational requirements of the equipment

Table D-2
Mechanical Dredging Schedule by Phase

Phase and Year	Volume Remediated (cy)	Area Remediated (acres)	Dredging Completion Date	Work Completion Date
Phase 1 (Year 1)	268,977	50	11/07/06	12/14/06
Phase 2 (Year 2)	529,440	78	10/13/07	12/19/07
Phase 2 (Year 3)	601, 810	86	11/12/08	12/22/08
Phase 2 (Year 4)	564,533	62	11/06/09	12/22/09
Phase 2 (Year 5)	447,387	53	9/29/10	11/12/10
Phase 2 (Year 6)	237,860	63	11/10/11	12/29/11

Table D-3
Phase 1 Dredging Quantities

Phase 1 Activities	Amount Completed During Phase 1 Demonstrated by Production Schedule	Phase 1 Performance Standard Requirement
Total Dredging	268,977 cy	Approximately 200,000 cy
Production Dredging	246,065 cy	Approximately 146,000 cy
Alternative Dredging Equipment (Shallow areas)	22,911 cy	Approximately 12,000 cy
Uncontained Dredging (Navigational Dredging)	80,366 cy	Approximately 42,000 cy

Table D-4
Cumulative Dredge Volumes

Phase and Year	Cumulative Volume Shown in Example Production Schedule (cy)	Required Cumulative Volume (cy)	Target Cumulative Volume (cy)
Phase 1 (Year 1)	268,977	200,000	265,000
Phase 2, (Year 2)	798,417	690,000	795,000
Phase 2, (Year 3)	1,400,227	1,180,000	1,325,000
Phase 2, (Year 4)	1,964,760	1,670,000	1,855,000
Phase 2, (Year 5)	2,412,147	2,160,000	2,385,000
Phase 2, (Year 6)	2,650,000	2,650,000	2,650,000

Table D-5
Example Production Schedule Production Rates

Site Preparation		
Work Element	Production Rate	Key Assumptions
Installing Containment Barriers:		Jersey barriers may be used in lieu of sheet piling in areas < 2' deep. HDPE silt barrier and steel sheet piling are not needed for navigational dredging areas or in areas of rock outcrops.
Steel Sheet Piling	90 l.f./day	Steel sheet piling installation assumes 1 crew (max 2 crews), 8 hours production time per day. [1]
HDPE Barriers	200 l.f./day	HDPE silt barrier installation assumes 2 crews (minimum 1 crew, maximum 4 crews), 8 hours production time per day.[2]
Clearing and Snagging Shoreline	400 l.f./day	Assumes <2 trees/down trees/logs on average per 100 l.f. shoreline. Assumes 8 hours production time per day. Clearing and Snagging Shoreline assumes 1 crew (maximum 2 crews).[3]
Remove Obstacles	1/2 day/ obstruction plus 1 day/ dock removal	Assumes 8 hours production time per day, assumes 1 crew.[3]
Dredging		
Work Element	Production Rate	Key Assumptions
Mechanical Dredging		
Production Equipment Dredging	82 cy/hr or 1066 cy/day[4]	Schedule based on 13 hr day Schedule based on 13 hr day of effective dredging time when dredging is actually under way.
Alternative Equipment Dredging[1]	27 cy/hr or 351 cy/day [4]	Alternative dredge(s) start work in an area 3 days after production dredge.
Additional Duration for Obstruction Dredging		1/2 day delay per obstruction.

[1] As discussed in Attachment F, for the mechanical dredging scenario presented in the Productivity Schedule, it is assumed that areas with a post-dredging water depth of 6' or greater (deep areas) would be performed by the large production dredge and areas with shallow post-dredging water depth of less that 6' (shallow areas) would be performed by the small alternative dredge. Due the large volume (approximately 155,000 cy) of

Table D-5
Example Production Schedule Production Rates

Confirmatory Testing and Surveying	Calculated lag	Starts 2 days after Alternative dredge starts and finishes 2 days after dredging is completed. Schedule assumes 1 crew, 13 hour days. Minimum one day for surveying for all areas less than 30 acres (approximately 30 acres/day).
Redredging	Calculated lag	Re-dredging (equipment will vary) schedule equal to ½ the total number of days required for design cut with the primary and alternative dredges. Re-dredging finishes 10 days after sampling completed. Schedule assumes 13 hours of effective dredging per day.
Additional Confirmatory Testing and Surveying	Calculated lag	Starts 2 days after Redredging starts and finish 2 days after re-dredging is completed. Schedule assumes 1 crew, 13 hour days.
Site Restoration		
Work Element	Production Rate	Key Assumptions
Backfilling		Backfilling finishes 7 days after re-confirmatory testing and surveying ends. Assumes closure areas managed in less than 5 acre areas.
Non-Critical Sub-sites	1 acre/day[5]	Schedule assumes maximum 2 crews for non-critical backfill areas, 8 hours per day.
Critical Sub-sites	1/2 acre/day[6]	Schedule assumes maximum 3 crews for critical backfill areas, 8 hours per day.
Shoreline Stabilization/ Restoration	150 l.f./day	Assumes 8 hours production time per day. Assumes fine stone fill, 50 cy/day; 9 c.f. per linear foot of shoreline; placed from water. Shoreline

shallow area material in the backwater area behind (west) of Griffin Island, an exception to this assumption was made in development of the Productivity Schedule. Specifically, we have assumed the utilization of a production dredge, or a different dredge with a production rate equal to or greater than the production dredge's 82 cy/hour rate. Furthermore, transport of the sediment would be accomplished using a technique such as pumping to scows in deeper water, pumping to the processing/transfer facility, partially loading scows, using enhanced-floatation deck barges, hauling in trucks across Griffin Island to load onto scows in deeper water, or some combination of these techniques. The underlying assumption is that these modified techniques would be less costly and more practical than having numerous (up to 4) small alternate dredges to accomplish the same volume.

Table D-5
Example Production Schedule Production Rates

		restoration assumes maximum 2 crews. Assumes 8 hours per day. Shoreline restoration included for navigational dredging areas that are not contained but are adjacent to the shoreline.
Post Backfill Surveying Non-Critical Sub-sites Critical Sub-sites	Calculated lag	Starts 2 days after the start of backfilling. Schedule assumes 1 crew (maximum 2 crews) 8 hours per day. Schedule assumes 1 crew (maximum 3 crews) 8 hours per day.
Removing Containment Barriers Steel Sheet Piling HDPE Barrier	 130 l.f./day[7] 300 l.f./day[7]	Removal of containment barriers will occur after backfill stabilization. Containment will be extracted and salvaged. Schedule assumes 1 crew (maximum 2 crews) will be used for Steel Sheet Piling removal. Assumes 8 hours per day. Schedule assumes 2 crews (minimum 1 crew, maximum 4 crews) will be used for Steel Sheet Piling removal. Assumes 8 hours per day.
Obstruction Replacement	1 day/dock[3]	Obstruction Replacement assumes 1 crew 8 hours per day.
Shoreline Stabilization/ Restoration	150 l.f./day	Assumes 8 hours production time per day. Assumes fine stone fill, 50 cy/day; 9 c.f. per linear foot of shoreline; placed from water. Shoreline restoration assumes maximum 2 crews. Assumes 8 hours per day. Shoreline restoration included for navigational dredging areas that are not contained but are adjacent to the shoreline.
Post Backfill Surveying Non-Critical Sub-sites Critical Sub-sites	Calculated lag	Starts 2 days after the start of backfilling. Schedule assumes 1 crew (maximum 2 crews) 8 hours per day. Schedule assumes 1 crew (maximum 3 crews) 8 hours per day.
Removing Containment Barriers Steel Sheet Piling	 130 l.f./day	Removal of containment barriers will occur after backfill stabilization. Containment will be extracted and salvaged. Schedule assumes 1 crew (maximum 2 crews) will be used for Steel Sheet Piling removal. Assumes 8

Table D-5
Example Production Schedule Production Rates

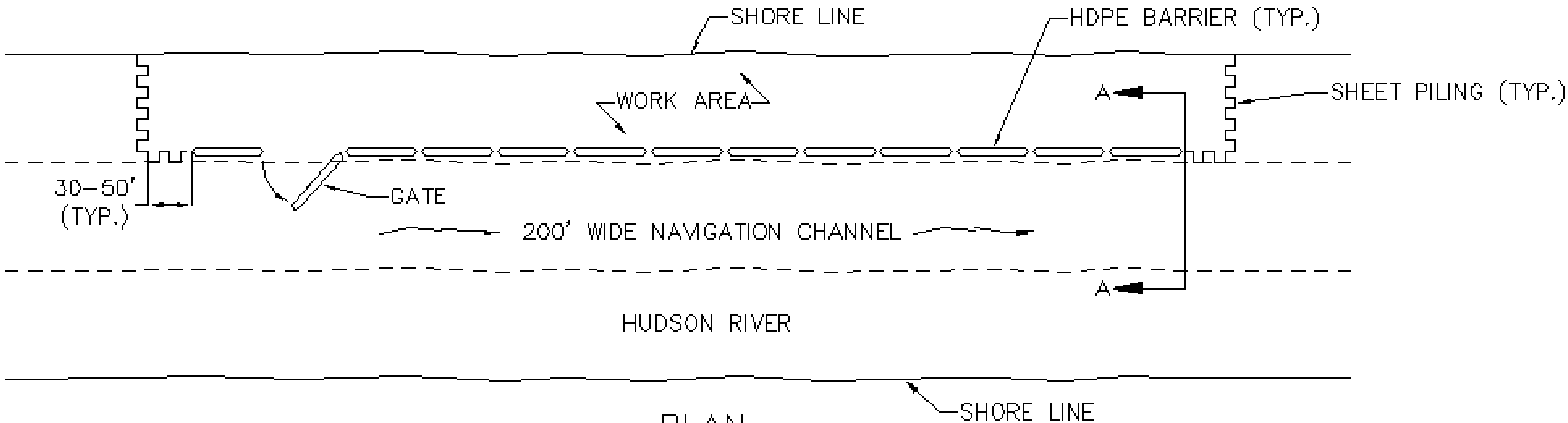
HDPE Barrier	300 l.f./day	hours per day. Schedule assumes 2 crews (minimum 1 crew, maximum 4 crews) will be used for Steel Sheet Piling removal. Assumes 8 hours per day.
Obstruction Replacement	1 day/dock	Obstruction Replacement assumes 1 crew 8 hours per day.

References for Productivity Rates

1. Draft Interim Completion Report for the St. Lawrence River Remediation Project at the Alcoa, Inc. Massena East Smelter Plant, New York; Bechtel Associates Professional Corporation, NY; March 3002.
2. Personal Communication between John Mulligan and Steven Laszewski, PhD, Foth and VanDyke Engineers, Green Bay, Wisconsin regarding silt barrier installation and removal rates at Fox River Deposit N project.
3. Allowance based on experience in removing and replacing private docks and removing snags from waterways.
4. Rates are based on a count of dredge bucket cycles per hour at remediation projects and telephone calls to remedial dredging contractors.

5. & 6. Discussions with John Lally, P.E., Program Manager, Bean Environmental regarding backfill placement rates using hydraulic spreading equipment.

7. RS Means Heavy Construction Cost Data, 16th Edition.



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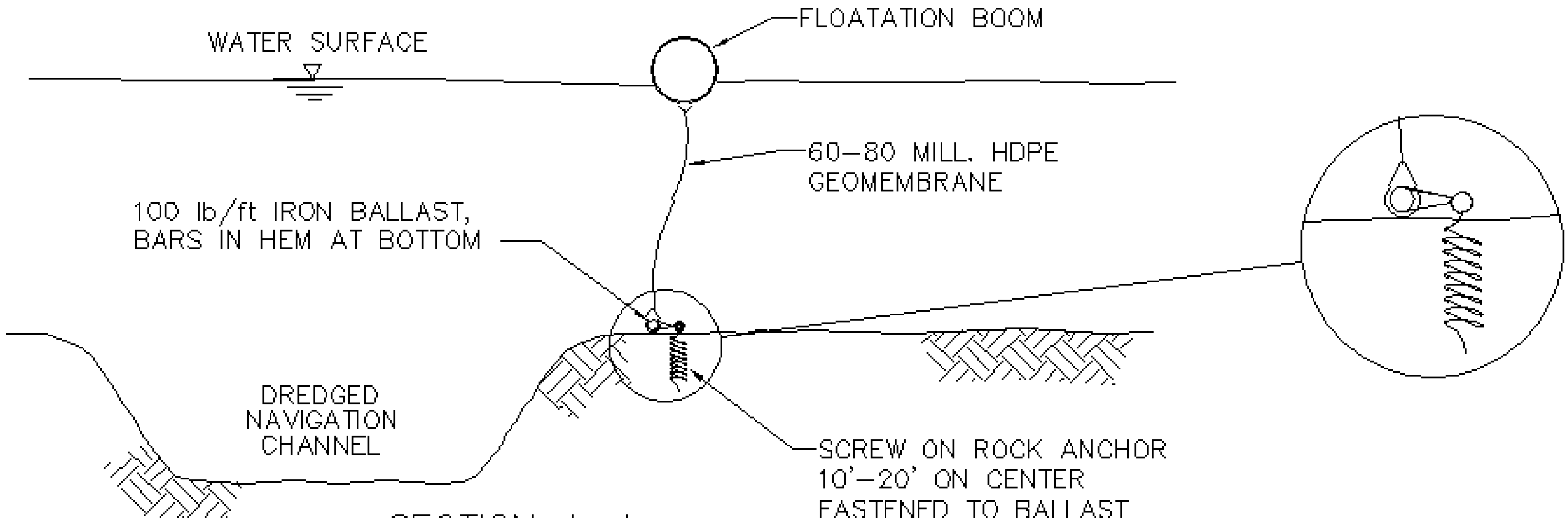

SECTION A–A
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MALCOLM PIRNIE

HUDSON RIVER PCB PROJECT

SILT BARRIER

FIGURE NO. D-1

Production Schedule:

Phase 1 (Year 1)

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Phase I						
Around Rogers Island RM 193.75 - 194.5						
Site Summary						
00000	Phase I (Year 1) (Summary)	195*	195*	0	02MAY06	14DEC06
00040	Site 1 (Summary)	149*	149*	0	02MAY06	21OCT06
Mobilization						
00005	Mobilization (Summary)	30	30	0	02MAY06	05JUN06
00020	Mobilize Equipment	20	20	0	02MAY06	24MAY06
00030	Activiate Infrastructure	30	30	0	02MAY06	05JUN06
Site Preparation						
00050	Site Preparation (Summary)	9	9	0	06JUN06	15JUN06
00060	Install Steel Sheet Piling	9	9	0	06JUN06	15JUN06
00070	Install HDPE Silt Barriers	2	2	0	14JUN06	15JUN06
00080	Clearing and Snagging Shoreline	1	1	0	15JUN06	15JUN06
00090	Remove Obstacles	3	3	0	13JUN06	15JUN06
Dredging						
00100	Dredging (Summary)	76	76	0	16JUN06	12SEP06
00110	Design Cut(s) - (1) Primary Dredge	61	61	0	16JUN06	25AUG06
00120	Design Cut(s) - (1) Alternate Dredge	36	36	0	20JUN06	31JUL06
00130	Add. Alternate Dredging Around Obstructions	2	2	0	01AUG06	02AUG06
00140	Confirmation Testing/Surveying - Primary Dredge	61	61	0	19JUN06	28AUG06
00150	Confirmation Testing/Surveying - Alt. Dredge	36	36	0	24JUN06	04AUG06
00160	Redredging	49	49	0	14JUL06	08SEP06
00170	Additional Confirmation Testing/Surveying	49	49	0	18JUL06	12SEP06
Restoration						
00180	Restoration (Summary)	44	44	0	01SEP06	21OCT06
00190	Backfill Non-Critical Areas	11	11	0	02SEP06	14SEP06
00200	Backfill Critical Areas	8	8	0	06SEP06	14SEP06
00210	Post Backfilling Survey (Non Critical Areas)	11	11	0	05SEP06	16SEP06
00220	Post Backfilling Survey (Critical Areas)	8	8	0	08SEP06	16SEP06
00225	Replace Obstructions	1	1	0	01SEP06	01SEP06
00230	Restore Shoreline	44	44	0	01SEP06	21OCT06
00240	Remove Sheet Piling	6	6	0	18SEP06	23SEP06
00250	Remove HPDE Silt Fences	1	1	0	18SEP06	18SEP06

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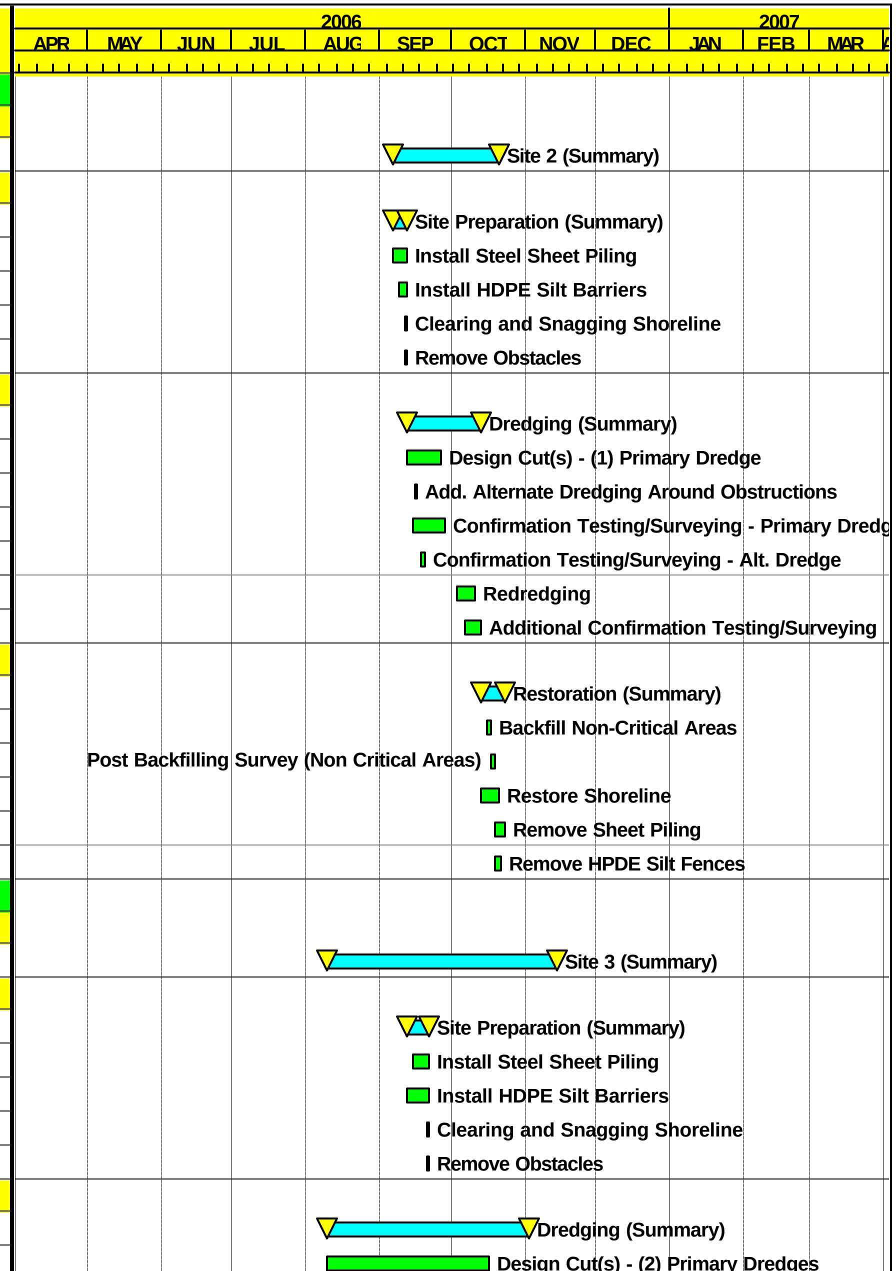
Example Production Schedule

Hudson River PCB Dredging

Phase I (Year 1)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
RM 193.5 - 193.75						
Site Summary						
00260	Site 2 (Summary)	38*	38*	0	07SEP06	20OCT06
Site Preparation						
00270	Site Preparation (Summary)	5	5	0	07SEP06	12SEP06
00280	Install Steel Sheet Piling	5	5	0	07SEP06	12SEP06
00290	Install HDPE Silt Barriers	3	3	0	09SEP06	12SEP06
00300	Clearing and Snagging Shoreline	1	1	0	12SEP06	12SEP06
00310	Remove Obstacles	1	1	0	12SEP06	12SEP06
Dredging						
00320	Dredging (Summary)	27	27	0	13SEP06	13OCT06
00330	Design Cut(s) - (1) Primary Dredge	12	12	0	13SEP06	26SEP06
00350	Add. Alternate Dredging Around Obstructions	1	1	0	16SEP06	16SEP06
00360	Confirmation Testing/Surveying - Primary Dredge	12	12	0	15SEP06	28SEP06
00370	Confirmation Testing/Surveying - Alt. Dredge	1	1	0	19SEP06	19SEP06
00380	Redredging	6	6	0	04OCT06	10OCT06
00390	Additional Confirmation Testing/Surveying	6	6	0	07OCT06	13OCT06
Restoration						
00400	Restoration (Summary)	8	8	0	14OCT06	23OCT06
00410	Backfill Non-Critical Areas	2	2	0	16OCT06	17OCT06
00430	Post Backfilling Survey (Non Critical Areas)	2	2	0	18OCT06	19OCT06
00450	Restore Shoreline	6	6	0	14OCT06	20OCT06
00460	Remove Sheet Piling	3	3	0	20OCT06	23OCT06
00470	Remove HPDE Silt Fences	2	2	0	20OCT06	21OCT06
RM 192.5 - 193.5 W						
Site Summary						
00480	Site 3 (Summary)	83*	83*	0	10AUG06	14NOV06
Site Preparation						
00490	Site Preparation (Summary)	8	8	0	13SEP06	21SEP06
00500	Install Steel Sheet Piling	6	6	0	15SEP06	21SEP06
00510	Install HDPE Silt Barriers	8	8	0	13SEP06	21SEP06
00520	Clearing and Snagging Shoreline	1	1	0	21SEP06	21SEP06
00530	Remove Obstacles	1	1	0	21SEP06	21SEP06
Dredging						
00540	Dredging (Summary)	73	73	0	10AUG06	02NOV06
00550	Design Cut(s) - (2) Primary Dredges	58	58	0	10AUG06	16OCT06



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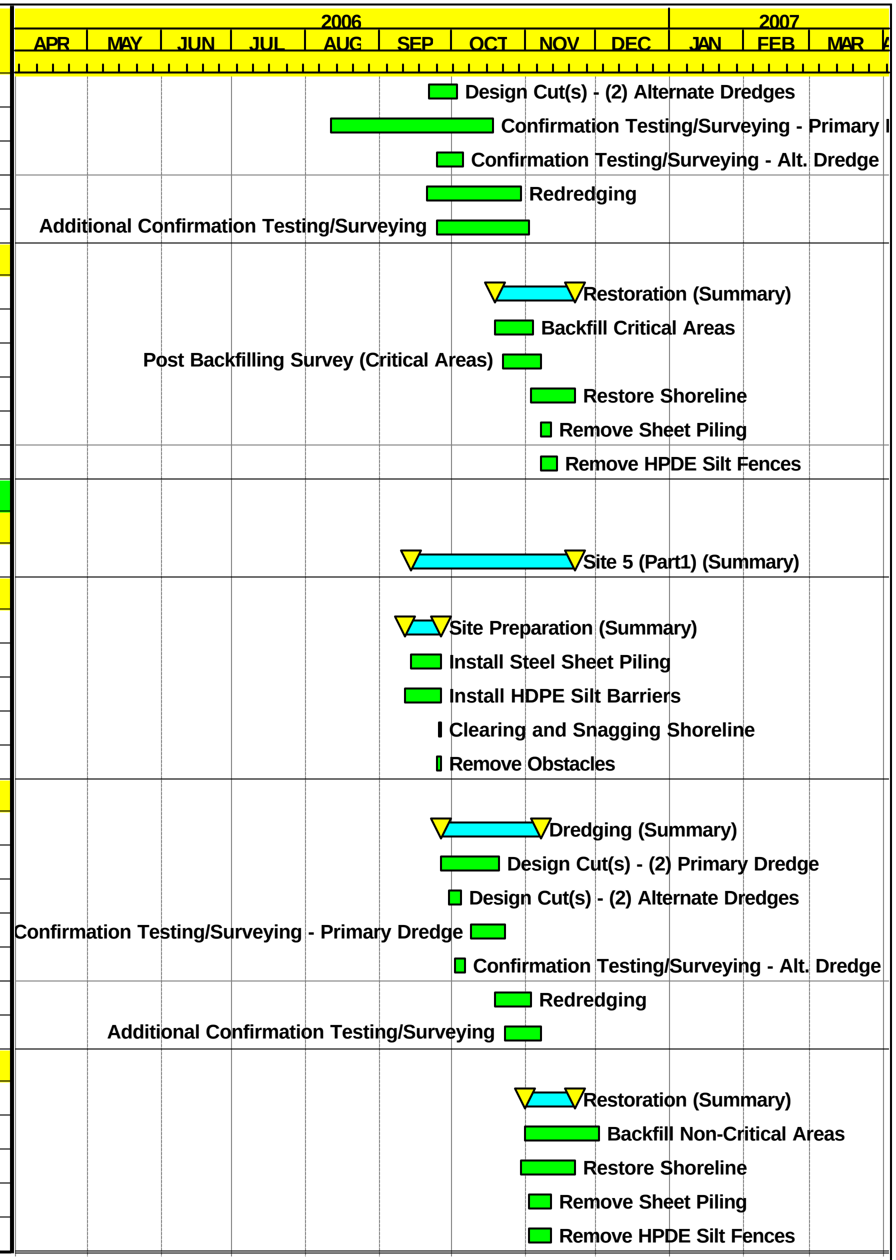
Example Production Schedule

Hudson River PCB Dredging

Phase I (Year 1)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
00560	Design Cut(s) - (2) Alternate Dredges	10	10	0	22SEP06	03OCT06
00580	Confirmation Testing/Surveying - Primary Dredge	58	58	0	12AUG06	18OCT06
00590	Confirmation Testing/Surveying - Alt. Dredge	10	10	0	25SEP06	05OCT06
00600	Redredging	34	34	0	21SEP06	30OCT06
00610	Additional Confirmation Testing/Surveying	34	34	0	25SEP06	02NOV06
Restoration						
00620	Restoration (Summary)	28	28	0	20OCT06	21NOV06
00640	Backfill Critical Areas	14	14	0	20OCT06	04NOV06
00660	Post Backfilling Survey (Critical Areas)	14	14	0	23OCT06	07NOV06
00670	Restore Shoreline	15	15	0	04NOV06	21NOV06
00680	Remove Sheet Piling	4	4	0	08NOV06	11NOV06
00690	Remove HPDE Silt Fences	6	6	0	08NOV06	14NOV06
RM 191.5 - 192.5 W Part 1						
Site Summary						
07000	Site 5 (Part1) (Summary)	59*	59*	0	14SEP06	21NOV06
Site Preparation						
07010	Site Preparation (Summary)	13*	13*	0	12SEP06	26SEP06
07020	Install Steel Sheet Piling	11	11	0	14SEP06	26SEP06
07030	Install HDPE Silt Barriers	13	13	0	12SEP06	26SEP06
07040	Clearing and Snagging Shoreline	1	1	0	26SEP06	26SEP06
07050	Remove Obstacles	2	2	0	25SEP06	26SEP06
Dredging						
07060	Dredging (Summary)	36*	36*	0	27SEP06	07NOV06
07070	Design Cut(s) - (2) Primary Dredge	21	21	0	27SEP06	20OCT06
07075	Design Cut(s) - (2) Alternate Dredges	4	4	0	30SEP06	04OCT06
07090	Confirmation Testing/Surveying - Primary Dredge	12	12	0	10OCT06	23OCT06
07100	Confirmation Testing/Surveying - Alt. Dredge	4	4	0	03OCT06	06OCT06
07110	Redredging	13	13	0	20OCT06	03NOV06
07120	Additional Confirmation Testing/Surveying	13	13	0	24OCT06	07NOV06
Restoration						
07130	Restoration (Summary)	18*	18*	0	01NOV06	21NOV06
07140	Backfill Non-Critical Areas	27	27	0	01NOV06	01DEC06
07160	Restore Shoreline	19	19	0	31OCT06	21NOV06
07170	Remove Sheet Piling	8	8	0	03NOV06	11NOV06
07180	Remove HPDE Silt Fences	8	8	0	03NOV06	11NOV06



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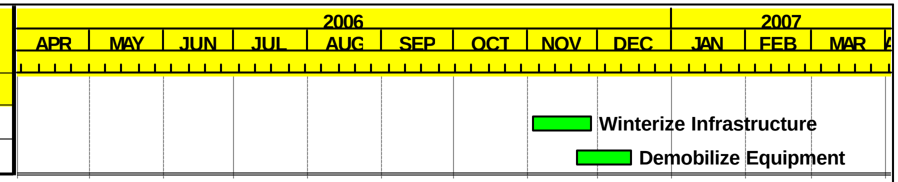
Example Production Schedule

Hudson River PCB Dredging

Phase I (Year 1)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Demobilization						
00695	Winterize Infrastructure	20	20	0	04NOV06	27NOV06
00696	Demobilize Equipment	20	20	0	22NOV06	14DEC06



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Example Production Schedule

Hudson River PCB Dredging

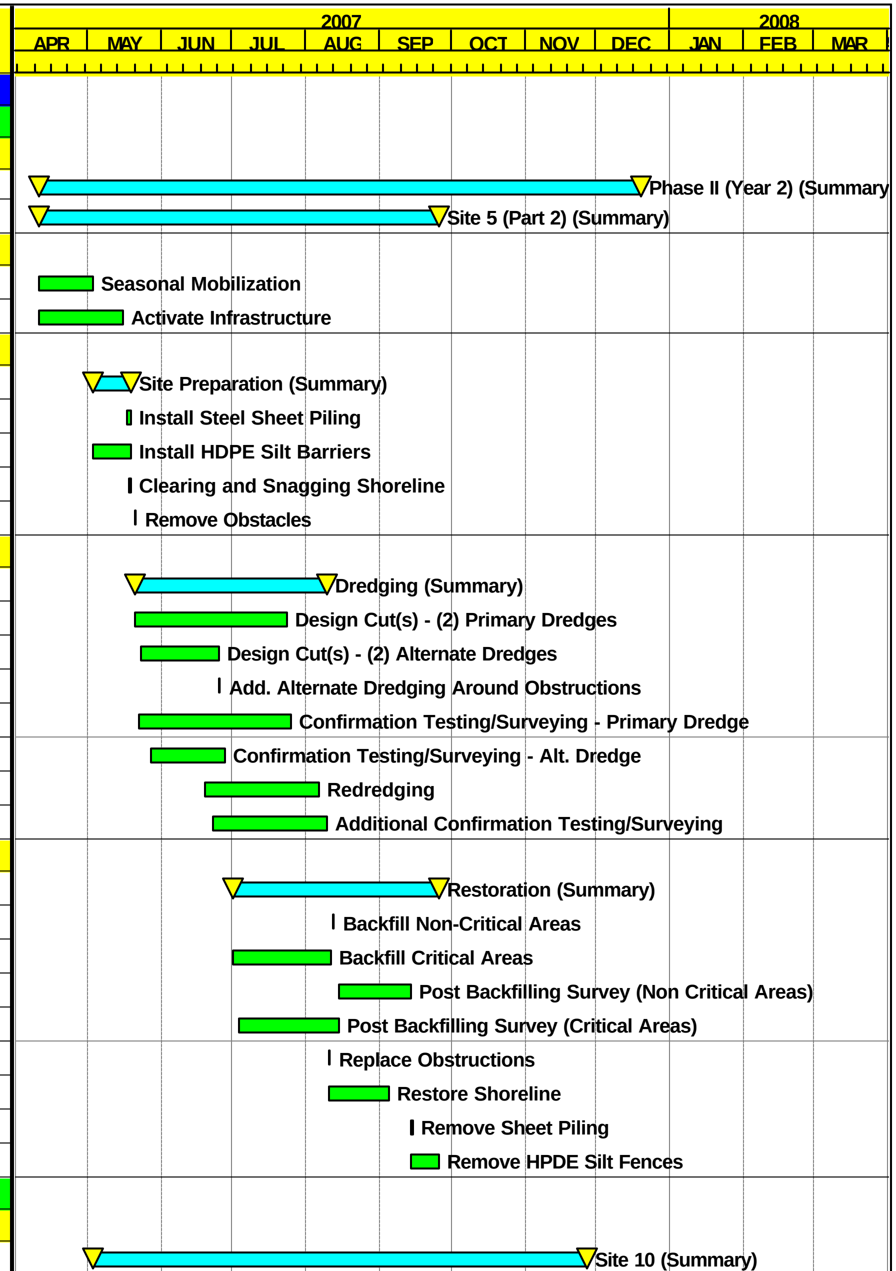
Phase I (Year 1)

Date	Revision	Checked	Approved

Production Schedule:

Phase 2 (Year 2)

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Phase II						
RM 191.5 - 192.5 W Part 2						
Site Summary						
00918	Phase II (Year 2) (Summary)	217*	217*	0	11APR07	19DEC07
00920	Site 5 (Part 2) (Summary)	144	144	0	11APR07	25SEP07
Mobilization						
00702	Seasonal Mobilization	20	20	0	11APR07*	03MAY07
00704	Activate Infrastructure	30	30	0	11APR07	15MAY07
Site Preparation						
00930	Site Preparation (Summary)	14	14	0	04MAY07	19MAY07
00940	Install Steel Sheet Piling	2	2	0	18MAY07	19MAY07
00950	Install HDPE Silt Barriers	14	14	0	04MAY07	19MAY07
00960	Clearing and Snagging Shoreline	1	1	0	19MAY07	19MAY07
00970	Remove Obstacles	0	0	0	21MAY07	19MAY07
Dredging						
00980	Dredging (Summary)	70	70	0	21MAY07	09AUG07
00990	Design Cut(s) - (2) Primary Dredges	55	55	0	21MAY07	23JUL07
01000	Design Cut(s) - (2) Alternate Dredges	28	28	0	24MAY07	25JUN07
01010	Add. Alternate Dredging Around Obstructions	0	0	0	26JUN07	25JUN07
01020	Confirmation Testing/Surveying - Primary Dredge	55	55	0	23MAY07	25JUL07
01030	Confirmation Testing/Surveying - Alt. Dredge	27	27	0	28MAY07	27JUN07
01040	Redredging	41	41	0	20JUN07	06AUG07
01050	Additional Confirmation Testing/Surveying	41	41	0	23JUN07	09AUG07
Restoration						
01060	Restoration (Summary)	74	74	0	02JUL07	25SEP07
01070	Backfill Non-Critical Areas	0	0	0	13AUG07	11AUG07
01080	Backfill Critical Areas	36	36	0	02JUL07	11AUG07
01090	Post Backfilling Survey (Non Critical Areas)	26	26	0	15AUG07	13SEP07
01100	Post Backfilling Survey (Critical Areas)	36	36	0	04JUL07	14AUG07
01105	Replace Obstructions	0	0	0	11AUG07	10AUG07
01110	Restore Shoreline	21	21	0	11AUG07	04SEP07
01120	Remove Sheet Piling	1	1	0	14SEP07	14SEP07
01130	Remove HPDE Silt Fences	10	10	0	14SEP07	25SEP07
RM 189.5 - 190.5 W						
Site Summary						
01800	Site 10 (Summary)	177	177	0	04MAY07	26NOV07



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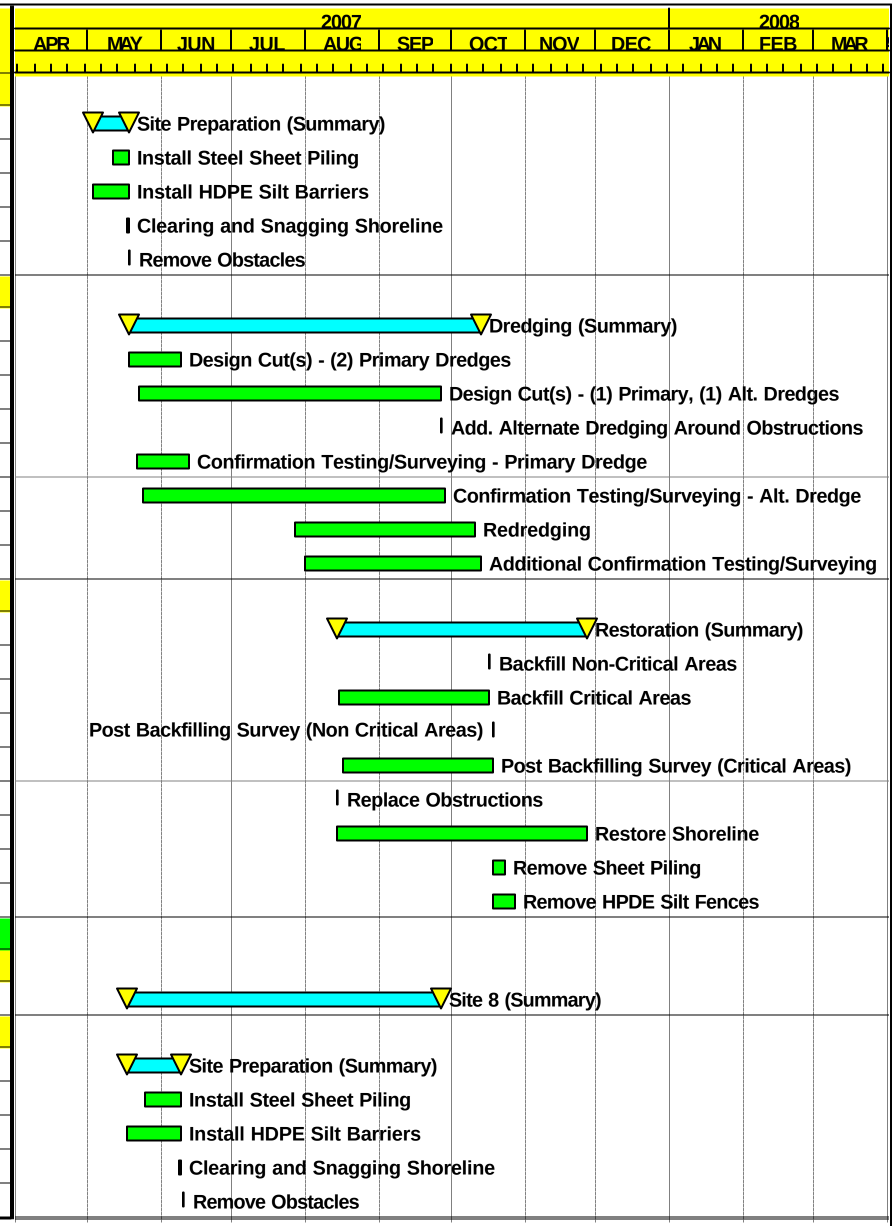
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 2)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Site Preparation						
01810	Site Preparation (Summary)	13	13	0	04MAY07	18MAY07
01820	Install Steel Sheet Piling	6	6	0	12MAY07	18MAY07
01830	Install HDPE Silt Barriers	13	13	0	04MAY07	18MAY07
01840	Clearing and Snagging Shoreline	1	1	0	18MAY07	18MAY07
01850	Remove Obstacles	0	0	0	19MAY07	18MAY07
Dredging						
01860	Dredging (Summary)	127	127	0	19MAY07	13OCT07
01870	Design Cut(s) - (2) Primary Dredges	19	19	0	19MAY07	09JUN07
01880	Design Cut(s) - (1) Primary, (1) Alt. Dredges	109	109	0	23MAY07	26SEP07
01890	Add. Alternate Dredging Around Obstructions	0	0	0	27SEP07	26SEP07
01900	Confirmation Testing/Surveying - Primary Dredge	19	19	0	22MAY07	12JUN07
01910	Confirmation Testing/Surveying - Alt. Dredge	109	109	0	25MAY07	28SEP07
01920	Redredging	64	64	0	28JUL07	10OCT07
01930	Additional Confirmation Testing/Surveying	64	64	0	01AUG07	13OCT07
Restoration						
01940	Restoration (Summary)	90	90	0	14AUG07	26NOV07
01950	Backfill Non-Critical Areas	0	0	0	17OCT07	16OCT07
01960	Backfill Critical Areas	54	54	0	15AUG07	16OCT07
01970	Post Backfilling Survey (Non Critical Areas)	0	0	0	19OCT07	18OCT07
01980	Post Backfilling Survey (Critical Areas)	54	54	0	17AUG07	18OCT07
01985	Replace Obstructions	0	0	0	14AUG07	13AUG07
01990	Restore Shoreline	90	90	0	14AUG07	26NOV07
02000	Remove Sheet Piling	4	4	0	19OCT07	23OCT07
02010	Remove HPDE Silt Fences	8	8	0	19OCT07	27OCT07
RM 190.5 - 191.5 W						
Site Summary						
01580	Site 8 (Summary)	113	113	0	18MAY07	26SEP07
Site Preparation						
01590	Site Preparation (Summary)	20	20	0	18MAY07	09JUN07
01600	Install Steel Sheet Piling	13	13	0	26MAY07	09JUN07
01610	Install HDPE Silt Barriers	20	20	0	18MAY07	09JUN07
01620	Clearing and Snagging Shoreline	1	1	0	09JUN07	09JUN07
01630	Remove Obstacles	0	0	0	11JUN07	09JUN07



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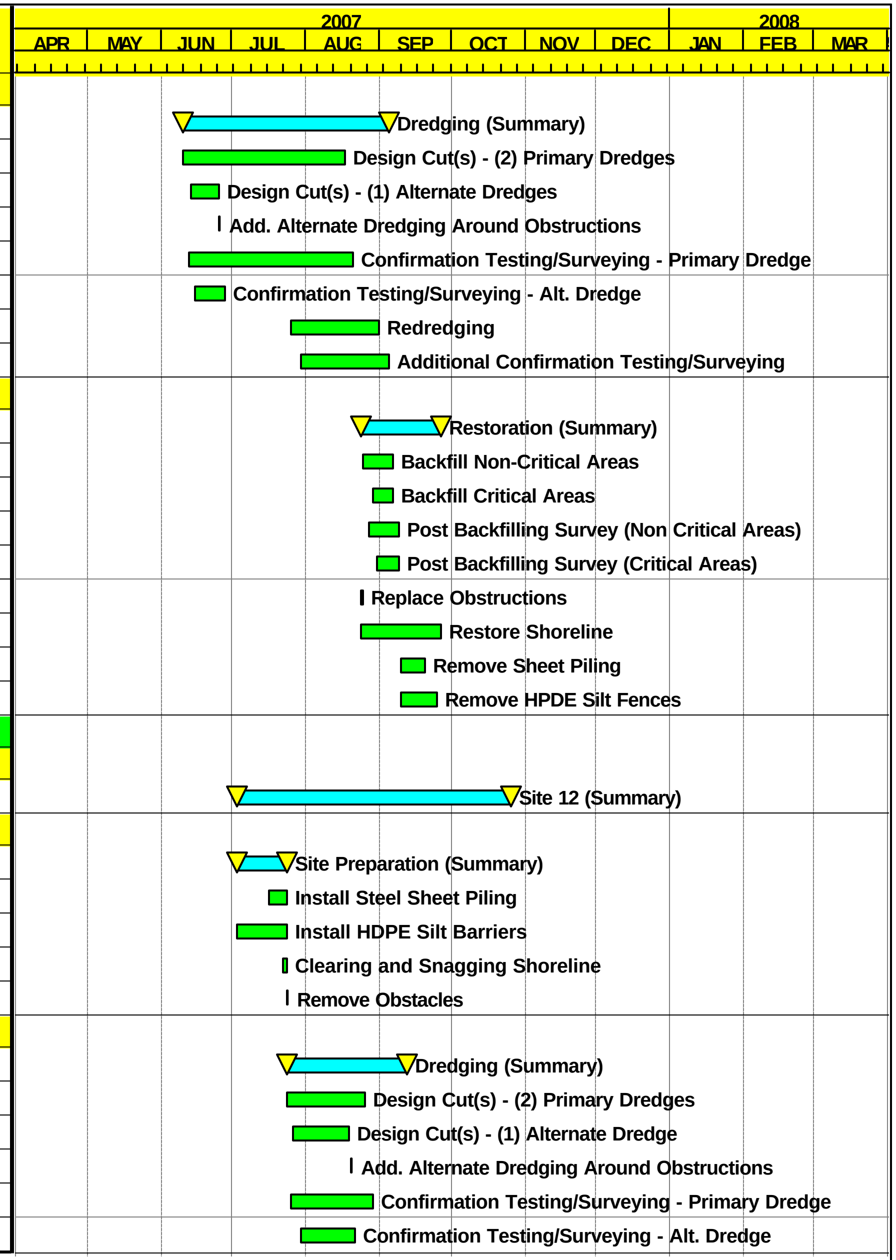
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 2)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Dredging						
01640	Dredging (Summary)	74	74	0	11JUN07	04SEP07
01650	Design Cut(s) - (2) Primary Dredges	59	59	0	11JUN07	17AUG07
01660	Design Cut(s) - (1) Alternate Dredges	10	10	0	14JUN07	25JUN07
01670	Add. Alternate Dredging Around Obstructions	0	0	0	26JUN07	25JUN07
01680	Confirmation Testing/Surveying - Primary Dredge	59	59	0	13JUN07	20AUG07
01690	Confirmation Testing/Surveying - Alt. Dredge	10	10	0	16JUN07	27JUN07
01700	Redredging	32	32	0	26JUL07	31AUG07
01710	Additional Confirmation Testing/Surveying	32	32	0	30JUL07	04SEP07
Restoration						
01720	Restoration (Summary)	29	29	0	24AUG07	26SEP07
01730	Backfill Non-Critical Areas	11	11	0	25AUG07	06SEP07
01740	Backfill Critical Areas	8	8	0	29AUG07	06SEP07
01750	Post Backfilling Survey (Non Critical Areas)	11	11	0	28AUG07	08SEP07
01760	Post Backfilling Survey (Critical Areas)	8	8	0	31AUG07	08SEP07
01765	Replace Obstructions	1	1	0	24AUG07	24AUG07
01770	Restore Shoreline	29	29	0	24AUG07	26SEP07
01780	Remove Sheet Piling	9	9	0	10SEP07	19SEP07
01790	Remove HPDE Silt Fences	13	13	0	10SEP07	24SEP07
RM 188.5 - 198.5 W						
Site Summary						
02460	Site 12 (Summary)	99	99	0	03JUL07	25OCT07
Site Preparation						
02470	Site Preparation (Summary)	18	18	0	03JUL07	23JUL07
02480	Install Steel Sheet Piling	6	6	0	17JUL07	23JUL07
02490	Install HDPE Silt Barriers	18	18	0	03JUL07	23JUL07
02500	Clearing and Snagging Shoreline	1	1	0	23JUL07	23JUL07
02510	Remove Obstacles	0	0	0	24JUL07	23JUL07
Dredging						
02520	Dredging (Summary)	44	44	0	24JUL07	12SEP07
02530	Design Cut(s) - (2) Primary Dredges	29	29	0	24JUL07	25AUG07
02540	Design Cut(s) - (1) Alternate Dredge	20	20	0	27JUL07	18AUG07
02550	Add. Alternate Dredging Around Obstructions	0	0	0	20AUG07	18AUG07
02560	Confirmation Testing/Surveying - Primary Dredge	29	29	0	26JUL07	28AUG07
02570	Confirmation Testing/Surveying - Alt. Dredge	20	20	0	30JUL07	21AUG07



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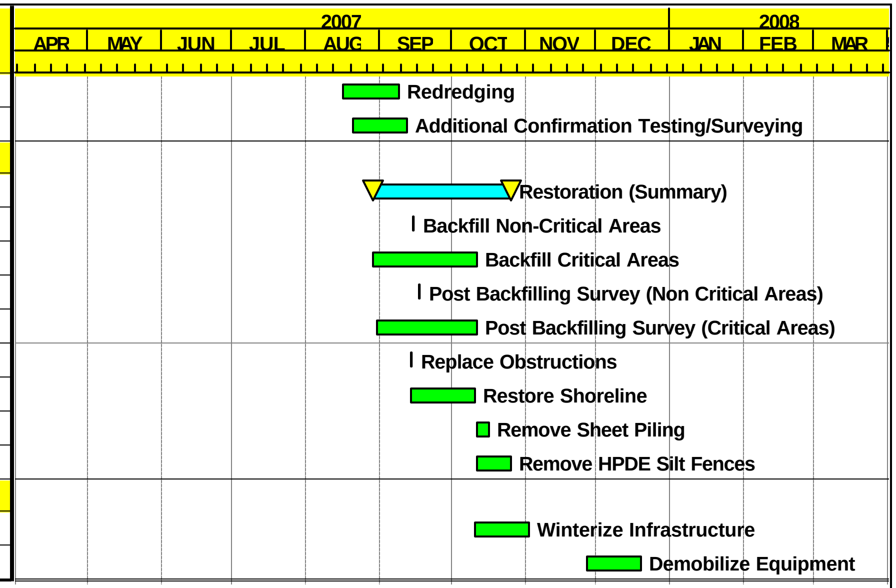
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 2)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
02580	Redredging	20	20	0	17AUG07	08SEP07
02590	Additional Confirmation Testing/Surveying	20	20	0	21AUG07	12SEP07
Restoration						
02600	Restoration (Summary)	50	50	0	29AUG07	25OCT07
02610	Backfill Non-Critical Areas	0	0	0	15SEP07	14SEP07
02620	Backfill Critical Areas	38	38	0	29AUG07	11OCT07
02630	Post Backfilling Survey (Non Critical Areas)	0	0	0	18SEP07	17SEP07
02640	Post Backfilling Survey (Critical Areas)	36	36	0	31AUG07	11OCT07
02645	Replace Obstructions	0	0	0	14SEP07	13SEP07
02650	Restore Shoreline	23	23	0	14SEP07	10OCT07
02660	Remove Sheet Piling	4	4	0	12OCT07	16OCT07
02670	Remove HPDE Silt Fences	12	12	0	12OCT07	25OCT07
Demobilization						
02232	Winterize Infrastructure	20	20	0	11OCT07	02NOV07
02234	Demobilize Equipment	20	20	0	27NOV07	19DEC07



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Example Production Schedule

Hudson River PCB Dredging

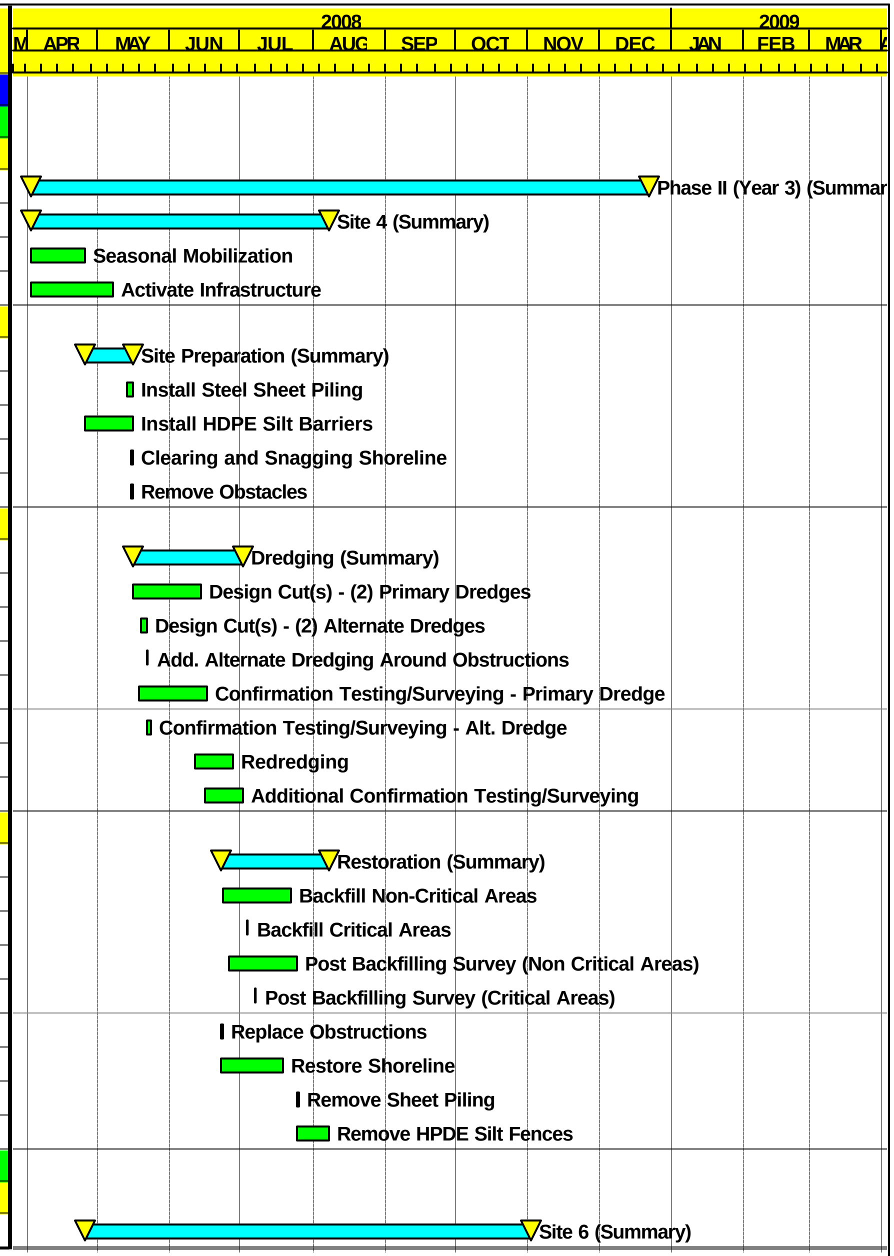
Phase II (Year 2)

Date	Revision	Checked	Approved

Production Schedule:

Phase 2 (Year 3)

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Phase II						
RM 192.5 - 193.5 E						
Site Summary						
00699	Phase II (Year 3) (Summary)	226*	226*	0	03APR08	22DEC08
00700	Site 4 (Summary)	109	109	0	03APR08	07AUG08
01801	Seasonal Mobilization	20	20	0	03APR08*	25APR08
01802	Activate Infrastructure	30	30	0	03APR08	07MAY08
Site Preparation						
00710	Site Preparation (Summary)	17	17	0	26APR08	15MAY08
00720	Install Steel Sheet Piling	2	2	0	14MAY08	15MAY08
00730	Install HDPE Silt Barriers	17	17	0	26APR08	15MAY08
00740	Clearing and Snagging Shoreline	1	1	0	15MAY08	15MAY08
00750	Remove Obstacles	1	1	0	15MAY08	15MAY08
Dredging						
00760	Dredging (Summary)	40	40	0	16MAY08	01JUL08
00770	Design Cut(s) - (2) Primary Dredges	25	25	0	16MAY08	13JUN08
00780	Design Cut(s) - (2) Alternate Dredges	2	2	0	20MAY08	21MAY08
00790	Add. Alternate Dredging Around Obstructions	0	0	0	22MAY08	21MAY08
00800	Confirmation Testing/Surveying - Primary Dredge	25	25	0	19MAY08	16JUN08
00810	Confirmation Testing/Surveying - Alt. Dredge	2	2	0	22MAY08	23MAY08
00820	Redredging	14	14	0	12JUN08	27JUN08
00830	Additional Confirmation Testing/Surveying	14	14	0	16JUN08	01JUL08
Restoration						
00840	Restoration (Summary)	40	40	0	23JUN08	07AUG08
00850	Backfill Non-Critical Areas	25	25	0	24JUN08	22JUL08
00860	Backfill Critical Areas	0	0	0	04JUL08	03JUL08
00870	Post Backfilling Survey (Non Critical Areas)	25	25	0	26JUN08	24JUL08
00880	Post Backfilling Survey (Critical Areas)	0	0	0	07JUL08	05JUL08
00885	Replace Obstructions	1	1	0	23JUN08	23JUN08
00890	Restore Shoreline	23	23	0	23JUN08	18JUL08
00900	Remove Sheet Piling	1	1	0	25JUL08	25JUL08
00910	Remove HPDE Silt Fences	12	12	0	25JUL08	07AUG08
RM 191.5 - 192.5 E						
Site Summary						
01140	Site 6 (Summary)	163	163	0	26APR08	01NOV08



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Hudson River PCB Dredging

Phase II (Year 3)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Site Preparation						
01150	Site Preparation (Summary)	25	25	0	26APR08	24MAY08
01160	Install Steel Sheet Piling	11	11	0	13MAY08	24MAY08
01170	Install HDPE Silt Barriers	25	25	0	26APR08	24MAY08
01180	Clearing and Snagging Shoreline	1	1	0	24MAY08	24MAY08
01190	Remove Obstacles	7	7	0	17MAY08	24MAY08
Dredging						
01200	Dredging (Summary)	110	110	0	26MAY08	30SEP08
01210	Design Cut(s) - (2) Primary Dredges	84	84	0	26MAY08	30AUG08
01220	Design Cut(s) - (2) Alternate Dredges	94	94	0	29MAY08	15SEP08
01230	Add. Alternate Dredging Around Obstructions	0	0	0	16SEP08	15SEP08
01240	Confirmation Testing/Surveying - Primary Dredge	84	84	0	28MAY08	02SEP08
01250	Confirmation Testing/Surveying - Alt. Dredge	94	94	0	31MAY08	17SEP08
01260	Redredging	89	89	0	16JUN08	26SEP08
01270	Additional Confirmation Testing/Surveying	89	89	0	19JUN08	30SEP08
Restoration						
01280	Restoration (Summary)	73	73	0	09AUG08	01NOV08
01290	Backfill Non-Critical Areas	0	0	0	03OCT08	02OCT08
01300	Backfill Critical Areas	46	46	0	11AUG08	02OCT08
01310	Post Backfilling Survey (Non Critical Areas)	0	0	0	06OCT08	04OCT08
01320	Post Backfilling Survey (Critical Areas)	46	46	0	13AUG08	04OCT08
01325	Replace Obstructions	7	7	0	09AUG08	16AUG08
01330	Restore Shoreline	73	73	0	09AUG08	01NOV08
01340	Remove Sheet Piling	8	8	0	06OCT08	14OCT08
01350	Remove HPDE Silt Fences	17	17	0	06OCT08	24OCT08
RM 109.5 - 191.5 E						
Site Summary						
01360	Site 7 (Summary)	101	101	0	14JUN08	09OCT08
Site Preparation						
01370	Site Preparation (Summary)	16	16	0	09JUL08	26JUL08
01380	Install Steel Sheet Piling	8	8	0	18JUL08	26JUL08
01390	Install HDPE Silt Barriers	16	16	0	09JUL08	26JUL08
01400	Clearing and Snagging Shoreline	1	1	0	26JUL08	26JUL08
01410	Remove Obstacles	0	0	0	28JUL08	26JUL08

Start Date	18APR05	HPCB	Sheet 2 of 5
Finish Date	29DEC11	**Example Production Schedule**	
Data Date	18APR05	**Hudson River PCB Dredging**	
Run Date	01APR04 10:34	**Phase II (Year 3)**	

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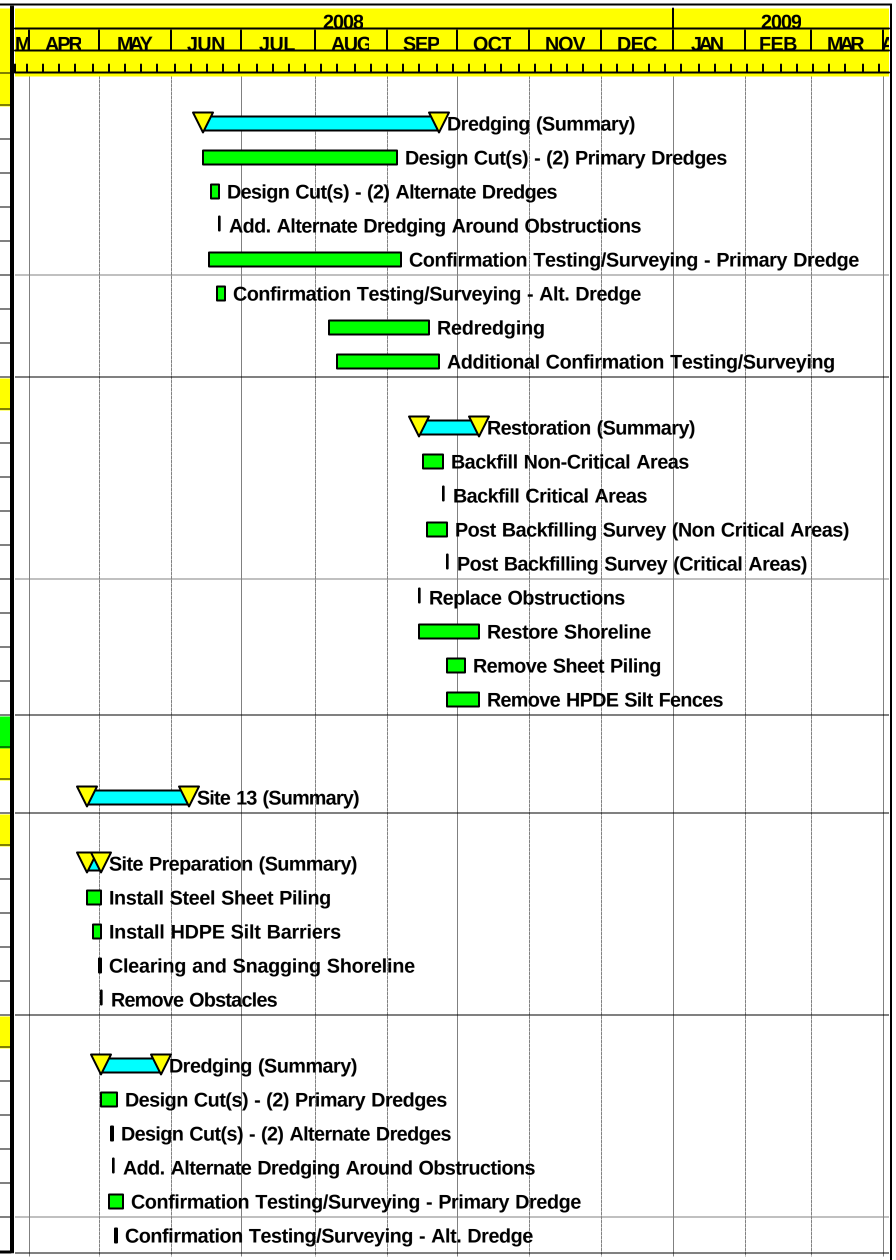
Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Dredging						
01420	Dredging (Summary)	86	86	0	14JUN08	22SEP08
01430	Design Cut(s) - (2) Primary Dredges	71	71	0	14JUN08	04SEP08
01440	Design Cut(s) - (2) Alternate Dredges	3	3	0	18JUN08	20JUN08
01450	Add. Alternate Dredging Around Obstructions	0	0	0	21JUN08	20JUN08
01460	Confirmation Testing/Surveying - Primary Dredge	71	71	0	17JUN08	06SEP08
01470	Confirmation Testing/Surveying - Alt. Dredge	3	3	0	20JUN08	23JUN08
01480	Redredging	37	37	0	07AUG08	18SEP08
01490	Additional Confirmation Testing/Surveying	37	37	0	11AUG08	22SEP08
Restoration						
01500	Restoration (Summary)	22	22	0	15SEP08	09OCT08
01510	Backfill Non-Critical Areas	8	8	0	16SEP08	24SEP08
01520	Backfill Critical Areas	0	0	0	25SEP08	24SEP08
01530	Post Backfilling Survey (Non Critical Areas)	8	8	0	18SEP08	26SEP08
01540	Post Backfilling Survey (Critical Areas)	0	0	0	27SEP08	26SEP08
01545	Replace Obstructions	0	0	0	15SEP08	13SEP08
01550	Restore Shoreline	22	22	0	15SEP08	09OCT08
01560	Remove Sheet Piling	6	6	0	27SEP08	03OCT08
01570	Remove HPDE Silt Fences	11	11	0	27SEP08	09OCT08
RM 187.5 - 188.5 W						
Site Summary						
02680	Site 13 (Summary)	37	37	0	26APR08	07JUN08
Site Preparation						
02690	Site Preparation (Summary)	5	5	0	26APR08	01MAY08
02700	Install Steel Sheet Piling	5	5	0	26APR08	01MAY08
02710	Install HDPE Silt Barriers	4	4	0	28APR08	01MAY08
02720	Clearing and Snagging Shoreline	1	1	0	01MAY08	01MAY08
02730	Remove Obstacles	0	0	0	02MAY08	01MAY08
Dredging						
02740	Dredging (Summary)	21	21	0	02MAY08	26MAY08
02750	Design Cut(s) - (2) Primary Dredges	6	6	0	02MAY08	08MAY08
02760	Design Cut(s) - (2) Alternate Dredges	1	1	0	06MAY08	06MAY08
02770	Add. Alternate Dredging Around Obstructions	0	0	0	07MAY08	06MAY08
02780	Confirmation Testing/Surveying - Primary Dredge	6	6	0	05MAY08	10MAY08
02790	Confirmation Testing/Surveying - Alt. Dredge	1	1	0	08MAY08	08MAY08



Start Date	18APR05
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HPCB

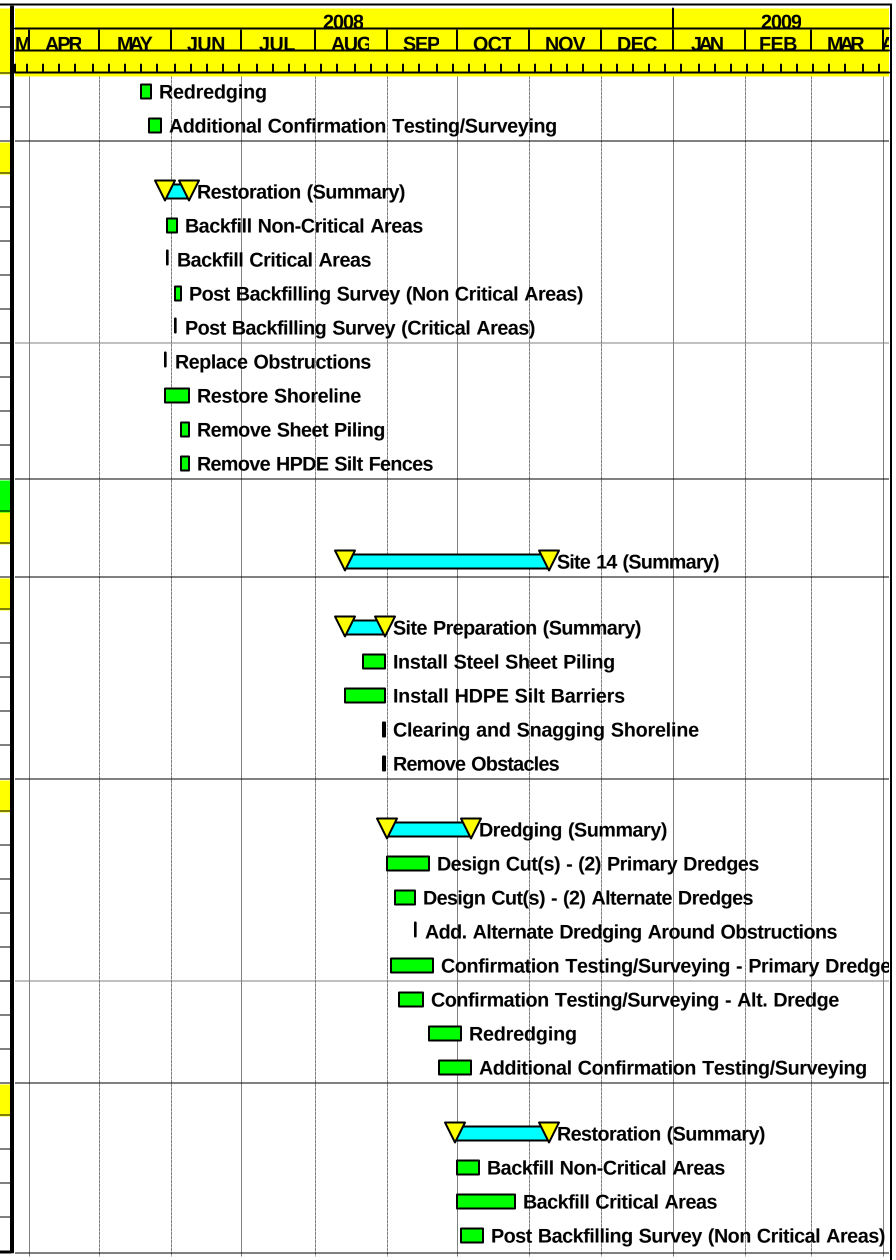
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 3)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
02800	Redredging	4	4	0	19MAY08	22MAY08
02810	Additional Confirmation Testing/Surveying	4	4	0	22MAY08	26MAY08
Restoration						
02820	Restoration (Summary)	9	9	0	29MAY08	07JUN08
02830	Backfill Non-Critical Areas	3	3	0	30MAY08	02JUN08
02840	Backfill Critical Areas	0	0	0	30MAY08	29MAY08
02850	Post Backfilling Survey (Non Critical Areas)	3	3	0	02JUN08	04JUN08
02860	Post Backfilling Survey (Critical Areas)	0	0	0	02JUN08	31MAY08
02865	Replace Obstructions	0	0	0	29MAY08	28MAY08
02870	Restore Shoreline	9	9	0	29MAY08	07JUN08
02880	Remove Sheet Piling	3	3	0	05JUN08	07JUN08
02890	Remove HPDE Silt Fences	3	3	0	05JUN08	07JUN08
RM 186.5 - 187.5 W						
Site Summary						
02900	Site 14 (Summary)	75	75	0	14AUG08	08NOV08
Site Preparation						
02910	Site Preparation (Summary)	15	15	0	14AUG08	30AUG08
02920	Install Steel Sheet Piling	8	8	0	22AUG08	30AUG08
02930	Install HDPE Silt Barriers	15	15	0	14AUG08	30AUG08
02940	Clearing and Snagging Shoreline	1	1	0	30AUG08	30AUG08
02950	Remove Obstacles	1	1	0	30AUG08	30AUG08
Dredging						
02960	Dredging (Summary)	31	31	0	01SEP08	06OCT08
02970	Design Cut(s) - (2) Primary Dredges	16	16	0	01SEP08	18SEP08
02980	Design Cut(s) - (2) Alternate Dredges	8	8	0	04SEP08	12SEP08
02990	Add. Alternate Dredging Around Obstructions	0	0	0	13SEP08	12SEP08
03000	Confirmation Testing/Surveying - Primary Dredge	16	16	0	03SEP08	20SEP08
03010	Confirmation Testing/Surveying - Alt. Dredge	8	8	0	06SEP08	15SEP08
03020	Redredging	12	12	0	19SEP08	02OCT08
03030	Additional Confirmation Testing/Surveying	12	12	0	23SEP08	06OCT08
Restoration						
03040	Restoration (Summary)	35	35	0	30SEP08	08NOV08
03050	Backfill Non-Critical Areas	8	8	0	01OCT08	09OCT08
03060	Backfill Critical Areas	22	22	0	01OCT08	25OCT08
03070	Post Backfilling Survey (Non Critical Areas)	8	8	0	03OCT08	11OCT08



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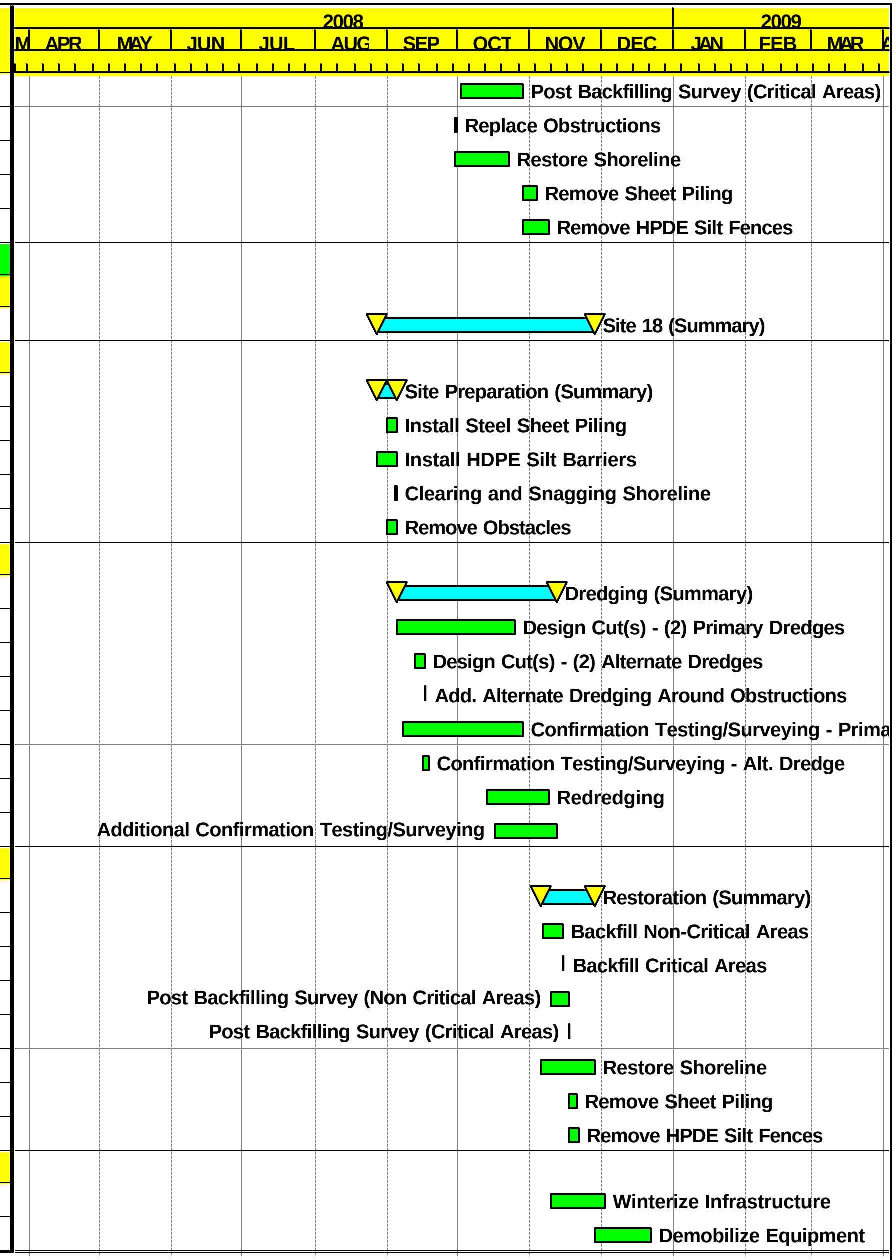
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 3)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
03080	Post Backfilling Survey (Critical Areas)	22	22	0	03OCT08	28OCT08
03085	Replace Obstructions	1	1	0	30SEP08	30SEP08
03090	Restore Shoreline	20	20	0	30SEP08	22OCT08
03100	Remove Sheet Piling	5	5	0	29OCT08	03NOV08
03110	Remove HPDE Silt Fences	10	10	0	29OCT08	08NOV08
RM 183.25 - 184.25 W						
Site Summary						
03780	Site 18 (Summary)	80	80	0	28AUG08	28NOV08
Site Preparation						
03790	Site Preparation (Summary)	7	7	0	28AUG08	04SEP08
03800	Install Steel Sheet Piling	4	4	0	01SEP08	04SEP08
03810	Install HDPE Silt Barriers	7	7	0	28AUG08*	04SEP08
03820	Clearing and Snagging Shoreline	1	1	0	04SEP08	04SEP08
03830	Remove Obstacles	4	4	0	01SEP08	04SEP08
Dredging						
03840	Dredging (Summary)	59	59	0	05SEP08	12NOV08
03850	Design Cut(s) - (2) Primary Dredges	44	44	0	05SEP08	25OCT08
03860	Design Cut(s) - (2) Alternate Dredges	3	3	0	13SEP08	16SEP08
03870	Add. Alternate Dredging Around Obstructions	0	0	0	17SEP08	16SEP08
03880	Confirmation Testing/Surveying - Primary Dredge	44	44	0	08SEP08	28OCT08
03890	Confirmation Testing/Surveying - Alt. Dredge	3	3	0	16SEP08	18SEP08
03900	Redredging	23	23	0	14OCT08	08NOV08
03910	Additional Confirmation Testing/Surveying	23	23	0	17OCT08	12NOV08
Restoration						
03920	Restoration (Summary)	20	20	0	06NOV08	28NOV08
03930	Backfill Non-Critical Areas	7	7	0	07NOV08	14NOV08
03940	Backfill Critical Areas	0	0	0	15NOV08	14NOV08
03950	Post Backfilling Survey (Non Critical Areas)	7	7	0	10NOV08	17NOV08
03960	Post Backfilling Survey (Critical Areas)	0	0	0	18NOV08	17NOV08
03970	Restore Shoreline	20	20	0	06NOV08	28NOV08
03980	Remove Sheet Piling	3	3	0	18NOV08	20NOV08
03990	Remove HPDE Silt Fences	4	4	0	18NOV08	21NOV08
Demobilization						
01572	Winterize Infrastructure	20	20	0	10NOV08	02DEC08
01574	Demobilize Equipment	20	20	0	29NOV08	22DEC08



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Finish Date	29DEC11		
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Example Production Schedule

Hudson River PCB Dredging

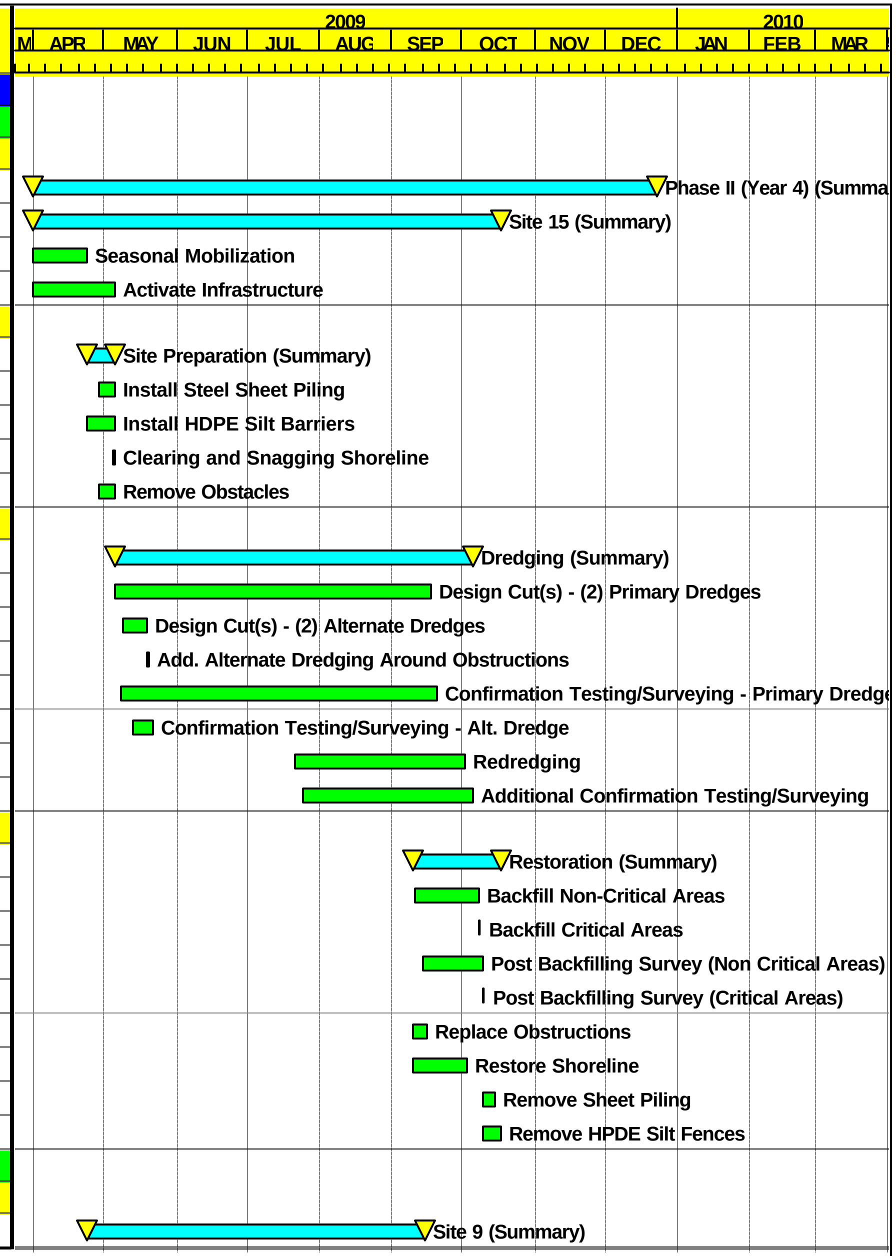
Phase II (Year 3)

Date	Revision	Checked	Approved

Production Schedule:

Phase 2 (Year 4)

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Phase II						
RM 185.25 - 186.25 E						
Site Summary						
02019	Phase II (Year 4) (Summary)	228*	228*	0	01APR09	22DEC09
03120	Site 15 (Summary)	172	172	0	01APR09	17OCT09
03121	Seasonal Mobilization	20	20	0	01APR09*	23APR09
03122	Activate Infrastructure	30	30	0	01APR09	05MAY09
Site Preparation						
03130	Site Preparation (Summary)	10	10	0	24APR09	05MAY09
03140	Install Steel Sheet Piling	6	6	0	29APR09	05MAY09
03150	Install HDPE Silt Barriers	10	10	0	24APR09	05MAY09
03160	Clearing and Snagging Shoreline	1	1	0	05MAY09	05MAY09
03170	Remove Obstacles	6	6	0	29APR09	05MAY09
Dredging						
03180	Dredging (Summary)	131	131	0	06MAY09	05OCT09
03190	Design Cut(s) - (2) Primary Dredges	116	116	0	06MAY09	17SEP09
03200	Design Cut(s) - (2) Alternate Dredges	8	8	0	09MAY09	18MAY09
03210	Add. Alternate Dredging Around Obstructions	1	1	0	19MAY09	19MAY09
03220	Confirmation Testing/Surveying - Primary Dredge	116	116	0	08MAY09	19SEP09
03230	Confirmation Testing/Surveying - Alt. Dredge	8	8	0	13MAY09	21MAY09
03240	Redredging	62	62	0	22JUL09	01OCT09
03250	Additional Confirmation Testing/Surveying	62	62	0	25JUL09	05OCT09
Restoration						
03260	Restoration (Summary)	33	33	0	10SEP09	17OCT09
03270	Backfill Non-Critical Areas	23	23	0	11SEP09	07OCT09
03280	Backfill Critical Areas	0	0	0	08OCT09	07OCT09
03290	Post Backfilling Survey (Non Critical Areas)	23	23	0	14SEP09	09OCT09
03300	Post Backfilling Survey (Critical Areas)	0	0	0	10OCT09	09OCT09
03305	Replace Obstructions	5	5	0	10SEP09	15SEP09
03310	Restore Shoreline	20	20	0	10SEP09	02OCT09
03320	Remove Sheet Piling	4	4	0	10OCT09	14OCT09
03330	Remove HPDE Silt Fences	7	7	0	10OCT09	17OCT09
RM 189.5 - 190.5 E						
Site Summary						
02020	Site 9 (Summary)	123	123	0	24APR09	14SEP09



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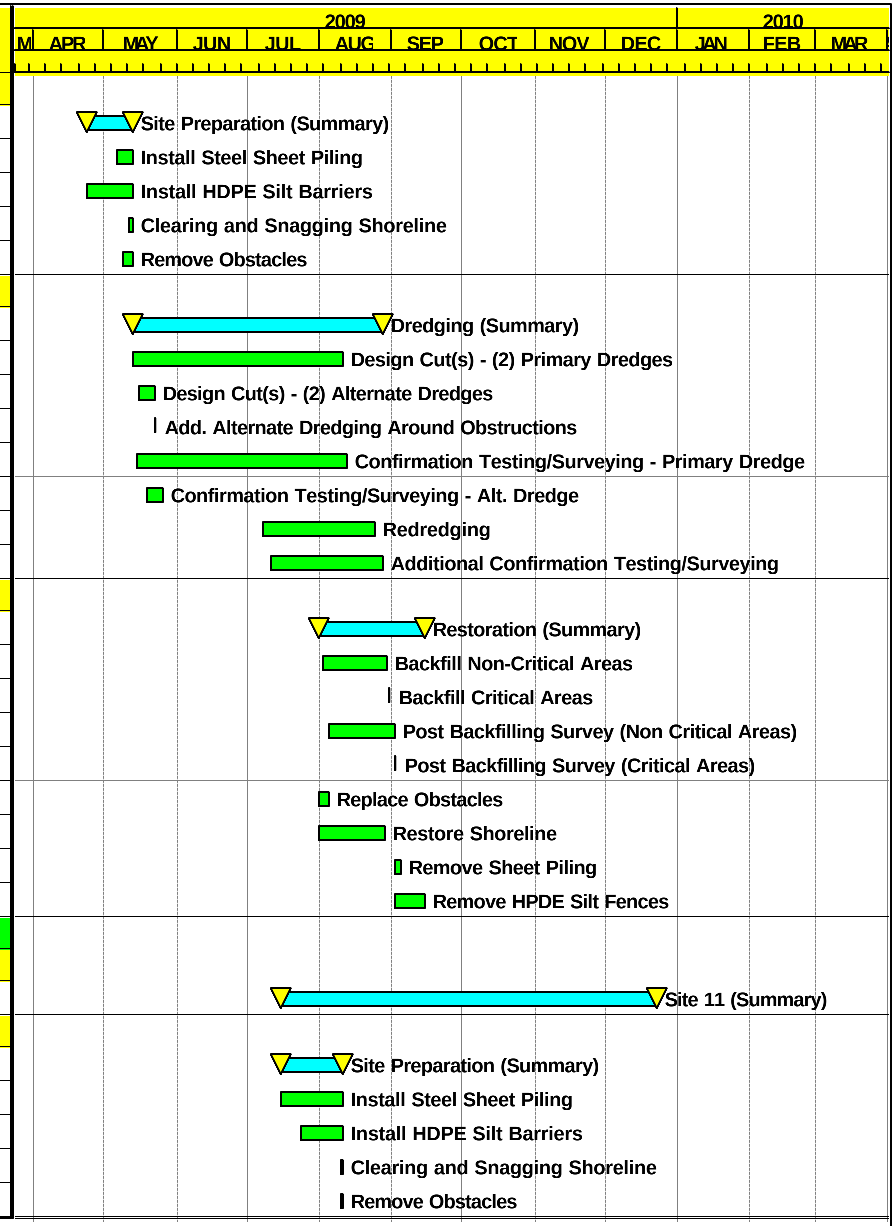
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 4)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Site Preparation						
02030	Site Preparation (Summary)	16	16	0	24APR09	12MAY09
02040	Install Steel Sheet Piling	5	5	0	07MAY09	12MAY09
02050	Install HDPE Silt Barriers	16	16	0	24APR09	12MAY09
02060	Clearing and Snagging Shoreline	1	1	0	12MAY09	12MAY09
02070	Remove Obstacles	3	3	0	09MAY09	12MAY09
Dredging						
02080	Dredging (Summary)	92	92	0	13MAY09	27AUG09
02090	Design Cut(s) - (2) Primary Dredges	77	77	0	13MAY09	10AUG09
02100	Design Cut(s) - (2) Alternate Dredges	6	6	0	16MAY09	22MAY09
02110	Add. Alternate Dredging Around Obstructions	0	0	0	23MAY09	22MAY09
02120	Confirmation Testing/Surveying - Primary Dredge	77	77	0	15MAY09	12AUG09
02130	Confirmation Testing/Surveying - Alt. Dredge	6	6	0	19MAY09	25MAY09
02140	Redredging	41	41	0	08JUL09	24AUG09
02150	Additional Confirmation Testing/Surveying	41	41	0	11JUL09	27AUG09
Restoration						
02160	Restoration (Summary)	38	38	0	01AUG09	14SEP09
02170	Backfill Non-Critical Areas	24	24	0	03AUG09	29AUG09
02180	Backfill Critical Areas	0	0	0	31AUG09	29AUG09
02190	Post Backfilling Survey (Non Critical Areas)	24	24	0	05AUG09	01SEP09
02200	Post Backfilling Survey (Critical Areas)	0	0	0	02SEP09	01SEP09
02205	Replace Obstacles	3	3	0	01AUG09	04AUG09
02210	Restore Shoreline	24	24	0	01AUG09	28AUG09
02220	Remove Sheet Piling	3	3	0	02SEP09	04SEP09
02230	Remove HPDE Silt Fences	11	11	0	02SEP09	14SEP09
RM 188.5 - 189.5 E						
Site Summary						
02240	Site 11 (Summary)	137	137	0	16JUL09	22DEC09
Site Preparation						
02250	Site Preparation (Summary)	22	22	0	16JUL09	10AUG09
02260	Install Steel Sheet Piling	22	22	0	16JUL09	10AUG09
02270	Install HDPE Silt Barriers	15	15	0	24JUL09	10AUG09
02280	Clearing and Snagging Shoreline	1	1	0	10AUG09	10AUG09
02290	Remove Obstacles	1	1	0	10AUG09	10AUG09



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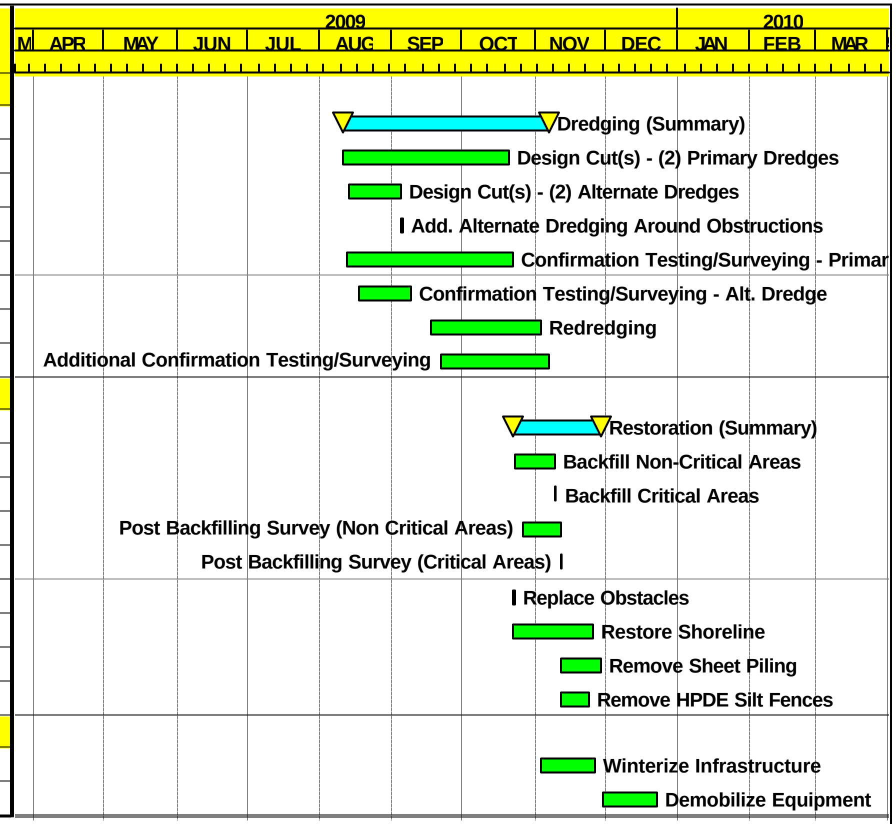
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 4)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Dredging						
02300	Dredging (Summary)	76	76	0	11AUG09	06NOV09
02310	Design Cut(s) - (2) Primary Dredges	61	61	0	11AUG09	20OCT09
02320	Design Cut(s) - (2) Alternate Dredges	19	19	0	14AUG09	04SEP09
02330	Add. Alternate Dredging Around Obstructions	1	1	0	05SEP09	05SEP09
02340	Confirmation Testing/Surveying - Primary Dredge	61	61	0	13AUG09	22OCT09
02350	Confirmation Testing/Surveying - Alt. Dredge	19	19	0	18AUG09	08SEP09
02360	Redredging	40	40	0	18SEP09	03NOV09
02370	Additional Confirmation Testing/Surveying	40	40	0	22SEP09	06NOV09
Restoration						
02380	Restoration (Summary)	32	32	0	23OCT09	28NOV09
02390	Backfill Non-Critical Areas	14	14	0	24OCT09	09NOV09
02400	Backfill Critical Areas	0	0	0	10NOV09	09NOV09
02410	Post Backfilling Survey (Non Critical Areas)	14	14	0	27OCT09	11NOV09
02420	Post Backfilling Survey (Critical Areas)	0	0	0	12NOV09	11NOV09
02425	Replace Obstacles	1	1	0	23OCT09	23OCT09
02430	Restore Shoreline	29	29	0	23OCT09	25NOV09
02440	Remove Sheet Piling	15	15	0	12NOV09	28NOV09
02450	Remove HPDE Silt Fences	10	10	0	12NOV09	23NOV09
Demobilization						
04872	Winterize Infrastructure	20	20	0	04NOV09	26NOV09
04874	Demobilize Equipment	20	20	0	30NOV09	22DEC09



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Example Production Schedule

Hudson River PCB Dredging

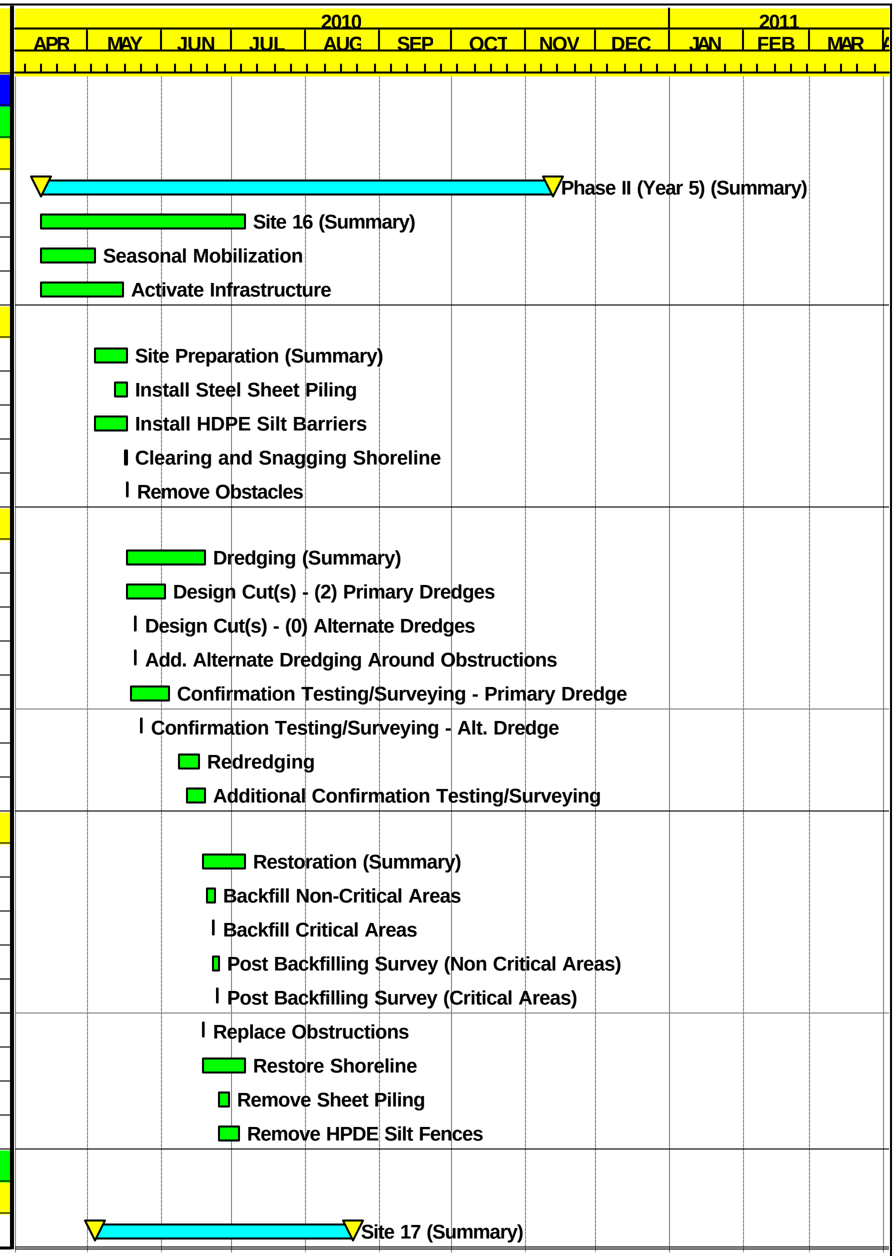
Phase II (Year 4)

Date	Revision	Checked	Approved

Production Schedule:

Phase 2 (Year 5)

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Phase II						
RM 184.25 - 185.25 E						
Site Summary						
03339	Phase II (Year 5) (Summary)	185*	185*	0	12APR10	12NOV10
03340	Site 16 (Summary)	74	74	0	12APR10	06JUL10
03562	Seasonal Mobilization	20	20	0	12APR10*	04MAY10
03564	Activate Infrastructure	30	30	0	12APR10	15MAY10
Site Preparation						
03350	Site Preparation (Summary)	11	11	0	05MAY10	17MAY10
03360	Install Steel Sheet Piling	4	4	0	13MAY10	17MAY10
03370	Install HDPE Silt Barriers	11	11	0	05MAY10	17MAY10
03380	Clearing and Snagging Shoreline	1	1	0	17MAY10	17MAY10
03390	Remove Obstacles	0	0	0	18MAY10	17MAY10
Dredging						
03400	Dredging (Summary)	29	29	0	18MAY10	19JUN10
03410	Design Cut(s) - (2) Primary Dredges	14	14	0	18MAY10	02JUN10
03420	Design Cut(s) - (0) Alternate Dredges	0	0	0	21MAY10	20MAY10
03430	Add. Alternate Dredging Around Obstructions	0	0	0	21MAY10	20MAY10
03440	Confirmation Testing/Surveying - Primary Dredge	14	14	0	20MAY10	04JUN10
03450	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	24MAY10	22MAY10
03460	Redredging	7	7	0	09JUN10	16JUN10
03470	Additional Confirmation Testing/Surveying	7	7	0	12JUN10	19JUN10
Restoration						
03480	Restoration (Summary)	15	15	0	19JUN10	06JUL10
03490	Backfill Non-Critical Areas	3	3	0	21JUN10	23JUN10
03500	Backfill Critical Areas	0	0	0	23JUN10	22JUN10
03510	Post Backfilling Survey (Non Critical Areas)	3	3	0	23JUN10	25JUN10
03520	Post Backfilling Survey (Critical Areas)	0	0	0	25JUN10	24JUN10
03525	Replace Obstructions	0	0	0	19JUN10	18JUN10
03530	Restore Shoreline	15	15	0	19JUN10	06JUL10
03540	Remove Sheet Piling	3	3	0	26JUN10	29JUN10
03550	Remove HPDE Silt Fences	7	7	0	26JUN10	03JUL10
RM 183.25 - 184.25 E						
Site Summary						
03560	Site 17 (Summary)	93	93	0	05MAY10	20AUG10



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Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 5)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Site Preparation						
03570	Site Preparation (Summary)	13	13	0	05MAY10	19MAY10
03580	Install Steel Sheet Piling	13	13	0	05MAY10	19MAY10
03590	Install HDPE Silt Barriers	13	13	0	05MAY10	19MAY10
03600	Clearing and Snagging Shoreline	1	1	0	19MAY10	19MAY10
03610	Remove Obstacles	0	0	0	20MAY10	19MAY10
Dredging						
03620	Dredging (Summary)	52	52	0	20MAY10	19JUL10
03630	Design Cut(s) - (2) Primary Dredges	37	37	0	20MAY10	01JUL10
03640	Design Cut(s) - (2) Alternate Dredges	20	20	0	24MAY10	15JUN10
03650	Add. Alternate Dredging Around Obstructions	0	0	0	16JUN10	15JUN10
03660	Confirmation Testing/Surveying - Primary Dredge	37	37	0	22MAY10	03JUL10
03670	Confirmation Testing/Surveying - Alt. Dredge	20	20	0	26MAY10	17JUN10
03680	Redredging	28	28	0	14JUN10	15JUL10
03690	Additional Confirmation Testing/Surveying	28	28	0	17JUN10	19JUL10
Restoration						
03700	Restoration (Summary)	49	49	0	25JUN10	20AUG10
03710	Backfill Non-Critical Areas	0	0	0	22JUL10	21JUL10
03720	Backfill Critical Areas	38	38	0	25JUN10	07AUG10
03730	Post Backfilling Survey (Non Critical Areas)	0	0	0	24JUL10	23JUL10
03740	Post Backfilling Survey (Critical Areas)	38	38	0	28JUN10	10AUG10
03750	Restore Shoreline	26	26	0	21JUL10	19AUG10
03760	Remove Sheet Piling	9	9	0	11AUG10	20AUG10
03770	Remove HPDE Silt Fences	9	9	0	11AUG10	20AUG10
RM 176.75 - 177.25 NAV						
Site Summary						
04000	Site 19 (Summary)	26	26	0	05MAY10	03JUN10
Site Preparation						
04010	Site Preparation (Summary)	0	0	0	05MAY10	04MAY10
04020	Install Steel Sheet Piling	0	0	0	05MAY10	04MAY10
04030	Install HDPE Silt Barriers	0	0	0	05MAY10	04MAY10
04040	Clearing and Snagging Shoreline	0	0	0	05MAY10	04MAY10
04050	Remove Obstacles	0	0	0	05MAY10	04MAY10
Dredging						
04060	Dredging (Summary)	19	19	0	05MAY10	26MAY10

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Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 5)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
04070	Design Cut(s) - (2) Primary Dredges	4	4	0	05MAY10	08MAY10
04080	Design Cut(s) - (0) Alternate Dredges	0	0	0	08MAY10	07MAY10
04090	Add. Alternate Dredging Around Obstructions	0	0	0	10MAY10	08MAY10
04100	Confirmation Testing/Surveying - Primary Dredge	4	4	0	07MAY10	11MAY10
04110	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	11MAY10	10MAY10
04120	Redredging	2	2	0	21MAY10	22MAY10
04130	Additional Confirmation Testing/Surveying	2	2	0	25MAY10	26MAY10
Restoration						
04150	Backfill Non-Critical Areas	0	0	0	02JUN10	01JUN10
04160	Backfill Critical Areas	0	0	0	02JUN10	01JUN10
04170	Post Backfilling Survey (Non Critical Areas)	0	0	0	04JUN10	03JUN10
04180	Post Backfilling Survey (Critical Areas)	0	0	0	04JUN10	03JUN10
04190	Restore Shoreline	0	0	0	01JUN10	31MAY10
04200	Remove Sheet Piling	0	0	0	04JUN10	03JUN10
04210	Remove HPDE Silt Fences	0	0	0	04JUN10	03JUN10
RM 175.00 - 175.25 NAV						
Site Summary						
04220	Site 20 (Summary)	26	26	0	05MAY10	03JUN10
Site Preparation						
04230	Site Preparation (Summary)	0	0	0	05MAY10	04MAY10
04240	Install Steel Sheet Piling	0	0	0	05MAY10	04MAY10
04250	Install HDPE Silt Barriers	0	0	0	05MAY10	04MAY10
04260	Clearing and Snagging Shoreline	0	0	0	05MAY10	04MAY10
04270	Remove Obstacles	0	0	0	05MAY10	04MAY10
Dredging						
04280	Dredging (Summary)	19	19	0	05MAY10	26MAY10
04290	Design Cut(s) - (2) Primary Dredges	4	4	0	05MAY10	08MAY10
04300	Design Cut(s) - (0) Alternate Dredges	0	0	0	08MAY10	07MAY10
04310	Add. Alternate Dredging Around Obstructions	0	0	0	10MAY10	08MAY10
04320	Confirmation Testing/Surveying - Primary Dredge	4	4	0	07MAY10	11MAY10
04330	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	11MAY10	10MAY10
04340	Redredging	2	2	0	21MAY10	22MAY10
04350	Additional Confirmation Testing/Surveying	2	2	0	25MAY10	26MAY10
Restoration						
04370	Backfill Non-Critical Areas	0	0	0	02JUN10	01JUN10

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Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 5)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
04380	Backfill Critical Areas	0	0	0	02JUN10	01JUN10
04390	Post Backfilling Survey (Non Critical Areas)	0	0	0	04JUN10	03JUN10
04400	Post Backfilling Survey (Critical Areas)	0	0	0	04JUN10	03JUN10
04410	Restore Shoreline	0	0	0	01JUN10	31MAY10
04420	Remove Sheet Piling	0	0	0	04JUN10	03JUN10
04430	Remove HPDE Silt Fences	0	0	0	04JUN10	03JUN10
RM 171.5 - 172.00 NAV						
Site Summary						
04440	Site 21 (Summary)	26	26	0	10MAY10	08JUN10
Site Preparation						
04450	Site Preparation (Summary)	0	0	0	10MAY10	09MAY10
04460	Install Steel Sheet Piling	0	0	0	10MAY10	08MAY10
04470	Install HDPE Silt Barriers	0	0	0	10MAY10	08MAY10
04480	Clearing and Snagging Shoreline	0	0	0	10MAY10	08MAY10
04490	Remove Obstacles	0	0	0	10MAY10	08MAY10
Dredging						
04500	Dredging (Summary)	19	19	0	10MAY10	31MAY10
04510	Design Cut(s) - (2) Primary Dredges	4	4	0	10MAY10	13MAY10
04520	Design Cut(s) - (0) Alternate Dredges	0	0	0	13MAY10	12MAY10
04530	Add. Alternate Dredging Around Obstructions	0	0	0	14MAY10	13MAY10
04540	Confirmation Testing/Surveying - Primary Dredge	4	4	0	12MAY10	15MAY10
04550	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	15MAY10	14MAY10
04560	Redredging	2	2	0	26MAY10	27MAY10
04570	Additional Confirmation Testing/Surveying	2	2	0	29MAY10	31MAY10
Restoration						
04590	Backfill Non-Critical Areas	0	0	0	07JUN10	05JUN10
04600	Backfill Critical Areas	0	0	0	07JUN10	05JUN10
04610	Post Backfilling Survey (Non Critical Areas)	0	0	0	09JUN10	08JUN10
04620	Post Backfilling Survey (Critical Areas)	0	0	0	09JUN10	08JUN10
04630	Restore Shoreline	0	0	0	05JUN10	04JUN10
04640	Remove Sheet Piling	0	0	0	09JUN10	08JUN10
04650	Remove HPDE Silt Fences	0	0	0	09JUN10	08JUN10
RM 169.25 - 170.25 E						
Site Summary						
04660	Site 22 (Summary)	142	142	0	08MAY10	20OCT10

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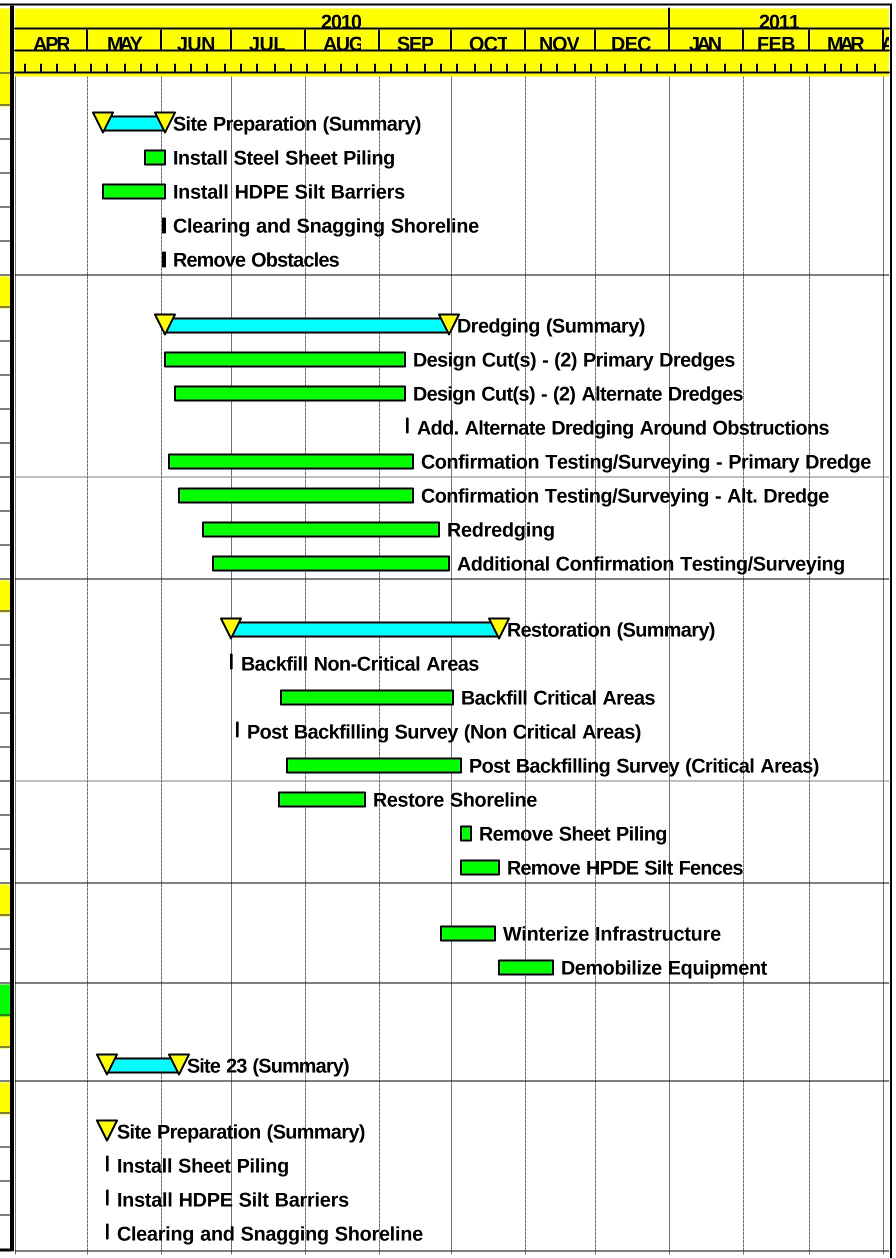
Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Site Preparation						
04670	Site Preparation (Summary)	22	22	0	08MAY10	02JUN10
04680	Install Steel Sheet Piling	7	7	0	26MAY10	02JUN10
04690	Install HDPE Silt Barriers	22	22	0	08MAY10	02JUN10
04700	Clearing and Snagging Shoreline	1	1	0	02JUN10	02JUN10
04710	Remove Obstacles	1	1	0	02JUN10	02JUN10
Dredging						
04720	Dredging (Summary)	102	102	0	03JUN10	29SEP10
04730	Design Cut(s) - (2) Primary Dredges	87	87	0	03JUN10	11SEP10
04740	Design Cut(s) - (2) Alternate Dredges	84	84	0	07JUN10	11SEP10
04750	Add. Alternate Dredging Around Obstructions	0	0	0	13SEP10	11SEP10
04760	Confirmation Testing/Surveying - Primary Dredge	87	87	0	05JUN10	14SEP10
04770	Confirmation Testing/Surveying - Alt. Dredge	84	84	0	09JUN10	14SEP10
04780	Redredging	85	85	0	19JUN10	25SEP10
04790	Additional Confirmation Testing/Surveying	85	85	0	23JUN10	29SEP10
Restoration						
04800	Restoration (Summary)	96	96	0	01JUL10	20OCT10
04810	Backfill Non-Critical Areas	0	0	0	01JUL10	30JUN10
04820	Backfill Critical Areas	62	62	0	22JUL10	01OCT10
04830	Post Backfilling Survey (Non Critical Areas)	0	0	0	03JUL10	02JUL10
04840	Post Backfilling Survey (Critical Areas)	62	62	0	24JUL10	04OCT10
04850	Restore Shoreline	31	31	0	21JUL10	25AUG10
04860	Remove Sheet Piling	5	5	0	05OCT10	09OCT10
04870	Remove HPDE Silt Fences	14	14	0	05OCT10	20OCT10
Demobilization						
03552	Winterize Infrastructure	20	20	0	27SEP10	19OCT10
03554	Demobilize Equipment	20	20	0	21OCT10	12NOV10
RM 167.0 - 167.5 NAV						
Site Summary						
04880	Site 23 (Summary)	26	26	0	10MAY10	08JUN10
Site Preparation						
04890	Site Preparation (Summary)	0	0	0	10MAY10	09MAY10
04900	Install Sheet Piling	0	0	0	10MAY10	08MAY10
04910	Install HDPE Silt Barriers	0	0	0	10MAY10	08MAY10
04920	Clearing and Snagging Shoreline	0	0	0	10MAY10	08MAY10



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Example Production Schedule

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Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
04930	Remove Obstacles	0	0	0	10MAY10	08MAY10
Dredging						
04940	Dredging (Summary)	19	19	0	10MAY10	31MAY10
04950	Design Cut(s) - (2) Primary Dredges	4	4	0	10MAY10	13MAY10
04960	Design Cut(s) - (0) Alternate Dredges	0	0	0	13MAY10	12MAY10
04970	Add. Alternate Dredging Around Obstructions	0	0	0	14MAY10	13MAY10
04980	Confirmation Testing/Surveying - Primary Dredge	4	4	0	12MAY10	15MAY10
04990	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	15MAY10	14MAY10
05000	Redredging	2	2	0	26MAY10	27MAY10
05010	Additional Confirmation Testing/Surveying	2	2	0	29MAY10	31MAY10
Restoration						
05030	Backfill Non-Critical Areas	0	0	0	07JUN10	05JUN10
05040	Backfill Critical Areas	0	0	0	07JUN10	05JUN10
05050	Post Backfilling Survey (Non Critical Areas)	0	0	0	09JUN10	08JUN10
05060	Post Backfilling Survey (Critical Areas)	0	0	0	09JUN10	08JUN10
05070	Restore Shoreline	0	0	0	05JUN10	04JUN10
05080	Remove Sheet Piling	0	0	0	09JUN10	08JUN10
05090	Remove HPDE Silt Fences	0	0	0	09JUN10	08JUN10
RM 164.25 - 165.0 NAV						
Site Summary						
05320	Site 25 (Summary)	26	26	0	14MAY10	12JUN10
Site Preparation						
05330	Site Preparation (Summary)	0	0	0	14MAY10	13MAY10
05340	Install Steel Sheet Piling	0	0	0	14MAY10	13MAY10
05350	Install HDPE Silt Barriers	0	0	0	14MAY10	13MAY10
05360	Clearing and Snagging Shoreline	0	0	0	14MAY10	13MAY10
05370	Remove Obstacles	0	0	0	14MAY10	13MAY10
Dredging						
05380	Dredging (Summary)	19	19	0	14MAY10	04JUN10
05390	Design Cut(s) - (2) Primary Dredges	4	4	0	14MAY10	18MAY10
05400	Design Cut(s) - (2) Alternate Dredges	0	0	0	18MAY10	17MAY10
05410	Add. Alternate Dredging Around Obstructions	0	0	0	19MAY10	18MAY10
05420	Confirmation Testing/Surveying - Primary Dredge	4	4	0	17MAY10	20MAY10
05430	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	20MAY10	19MAY10
05440	Redredging	2	2	0	31MAY10	01JUN10

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Example Production Schedule

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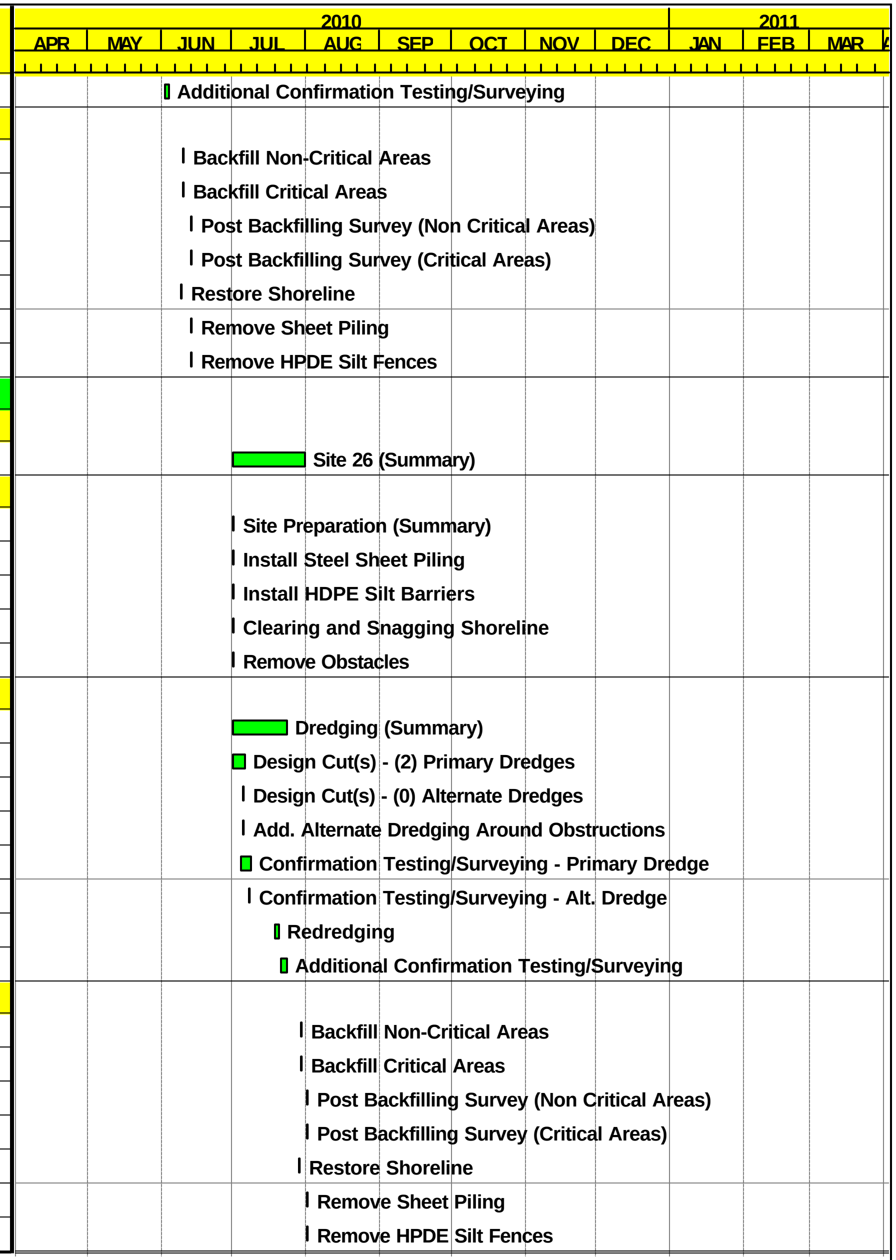
Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
05450	Additional Confirmation Testing/Surveying	2	2	0	03JUN10	04JUN10
Restoration						
05470	Backfill Non-Critical Areas	0	0	0	11JUN10	10JUN10
05480	Backfill Critical Areas	0	0	0	11JUN10	10JUN10
05490	Post Backfilling Survey (Non Critical Areas)	0	0	0	14JUN10	12JUN10
05500	Post Backfilling Survey (Critical Areas)	0	0	0	14JUN10	12JUN10
05510	Restore Shoreline	0	0	0	10JUN10	09JUN10
05520	Remove Sheet Piling	0	0	0	14JUN10	12JUN10
05530	Remove HPDE Silt Fences	0	0	0	14JUN10	12JUN10
RM 164.0 - 164.25 NAV						
Site Summary						
05540	Site 26 (Summary)	26	26	0	02JUL10	31JUL10
Site Preparation						
05550	Site Preparation (Summary)	0	0	0	02JUL10	01JUL10
05560	Install Steel Sheet Piling	0	0	0	02JUL10	01JUL10
05570	Install HDPE Silt Barriers	0	0	0	02JUL10	01JUL10
05580	Clearing and Snagging Shoreline	0	0	0	02JUL10	01JUL10
05590	Remove Obstacles	0	0	0	02JUL10	01JUL10
Dredging						
05600	Dredging (Summary)	19	19	0	02JUL10	23JUL10
05610	Design Cut(s) - (2) Primary Dredges	4	4	0	02JUL10	06JUL10
05620	Design Cut(s) - (0) Alternate Dredges	0	0	0	06JUL10	05JUL10
05630	Add. Alternate Dredging Around Obstructions	0	0	0	06JUL10	05JUL10
05640	Confirmation Testing/Surveying - Primary Dredge	4	4	0	05JUL10	08JUL10
05650	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	08JUL10	07JUL10
05660	Redredging	2	2	0	19JUL10	20JUL10
05670	Additional Confirmation Testing/Surveying	2	2	0	22JUL10	23JUL10
Restoration						
05690	Backfill Non-Critical Areas	0	0	0	30JUL10	29JUL10
05700	Backfill Critical Areas	0	0	0	30JUL10	29JUL10
05710	Post Backfilling Survey (Non Critical Areas)	0	0	0	02AUG10	31JUL10
05720	Post Backfilling Survey (Critical Areas)	0	0	0	02AUG10	31JUL10
05730	Restore Shoreline	0	0	0	29JUL10	28JUL10
05740	Remove Sheet Piling	0	0	0	02AUG10	31JUL10
05750	Remove HPDE Silt Fences	0	0	0	02AUG10	31JUL10



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Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
RM 162.25 - 162.75 NAV						
Site Summary						
05980	Site 28 (Summary)	33	33	0	07JUL10	13AUG10
Site Preparation						
05990	Site Preparation (Summary)	0	0	0	07JUL10	06JUL10
06000	Install Steel Sheet Piling	0	0	0	07JUL10	06JUL10
06010	Install HDPE Silt Barriers	0	0	0	07JUL10	06JUL10
06020	Clearing and Snagging Shoreline	0	0	0	07JUL10	06JUL10
06030	Remove Obstacles	0	0	0	07JUL10	06JUL10
Dredging						
06040	Dredging (Summary)	21	21	0	07JUL10	30JUL10
06050	Design Cut(s) - (2) Primary Dredges	6	6	0	07JUL10	13JUL10
06060	Design Cut(s) - (0) Alternate Dredges	0	0	0	10JUL10	09JUL10
06070	Add. Alternate Dredging Around Obstructions	0	0	0	14JUL10	13JUL10
06080	Confirmation Testing/Surveying - Primary Dredge	6	6	0	09JUL10	15JUL10
06090	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	13JUL10	12JUL10
06100	Redredging	3	3	0	24JUL10	27JUL10
06110	Additional Confirmation Testing/Surveying	3	3	0	28JUL10	30JUL10
Restoration						
06120	Restoration (Summary)	9	9	0	04AUG10	13AUG10
06130	Backfill Non-Critical Areas	0	0	0	05AUG10	04AUG10
06140	Backfill Critical Areas	0	0	0	05AUG10	04AUG10
06150	Post Backfilling Survey (Non Critical Areas)	0	0	0	07AUG10	06AUG10
06160	Post Backfilling Survey (Critical Areas)	0	0	0	07AUG10	06AUG10
06170	Restore Shoreline	0	0	0	04AUG10	03AUG10
06180	Remove Sheet Piling	0	0	0	07AUG10	06AUG10
06190	Remove HPDE Silt Fences	0	0	0	07AUG10	06AUG10
RM 159.25 - 159.75 NAV						
Site Summary						
06200	Site 29 (Summary)	27	27	0	14JUL10	13AUG10
Site Preparation						
06210	Site Preparation (Summary)	0	0	0	14JUL10	13JUL10
06220	Install Steel Sheet Piling	0	0	0	14JUL10	13JUL10
06230	Install HDPE Silt Barriers	0	0	0	14JUL10	13JUL10
06240	Clearing and Snagging Shoreline	0	0	0	14JUL10	13JUL10

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Phase II (Year 5)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
06250	Remove Obstacles	0	0	0	14JUL10	13JUL10
Dredging						
06260	Dredging (Summary)	21	21	0	14JUL10	06AUG10
06270	Design Cut(s) - (2) Primary Dredges	6	6	0	14JUL10	20JUL10
06280	Design Cut(s) - (0) Alternate Dredges	0	0	0	17JUL10	16JUL10
06290	Add. Alternate Dredging Around Obstructions	0	0	0	21JUL10	20JUL10
06300	Confirmation Testing/Surveying - Primary Dredge	6	6	0	16JUL10	22JUL10
06310	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	20JUL10	19JUL10
06320	Redredging	3	3	0	31JUL10	03AUG10
06330	Additional Confirmation Testing/Surveying	3	3	0	04AUG10	06AUG10
Restoration						
06340	Restoration (Summary)	2	2	0	12AUG10	13AUG10
06350	Backfill Non-Critical Areas	0	0	0	12AUG10	11AUG10
06360	Backfill Critical Areas	0	0	0	12AUG10	11AUG10
06370	Post Backfilling Survey (Non Critical Areas)	0	0	0	14AUG10	13AUG10
06380	Post Backfilling Survey (Critical Areas)	0	0	0	14AUG10	13AUG10
06390	Restore Shoreline	0	0	0	11AUG10	10AUG10
06400	Remove Sheet Piling	0	0	0	14AUG10	13AUG10
06410	Remove HPDE Silt Fences	0	0	0	14AUG10	13AUG10
RM 158.5 - 159.25 NAV						
Site Summary						
06420	Site 30 (Summary)	27	27	0	21JUL10	20AUG10
Site Preparation						
06430	Site Preparation (Summary)	0	0	0	21JUL10	20JUL10
06440	Install Steel Sheet Piling	0	0	0	21JUL10	20JUL10
06450	Install HDPE Silt Barriers	0	0	0	21JUL10	20JUL10
06460	Clearing and Snagging Shoreline	0	0	0	21JUL10	20JUL10
06470	Remove Obstacles	0	0	0	21JUL10	20JUL10
Dredging						
06480	Dredging (Summary)	21	21	0	21JUL10	13AUG10
06490	Design Cut(s) - (2) Primary Dredges	6	6	0	21JUL10	27JUL10
06500	Design Cut(s) - (0) Alternate Dredges	0	0	0	24JUL10	23JUL10
06510	Add. Alternate Dredging Around Obstructions	0	0	0	28JUL10	27JUL10
06520	Confirmation Testing/Surveying - Primary Dredge	6	6	0	23JUL10	29JUL10
06530	Confirmation Testing/Surveying - Alt. Dredge	0	0	0	27JUL10	26JUL10

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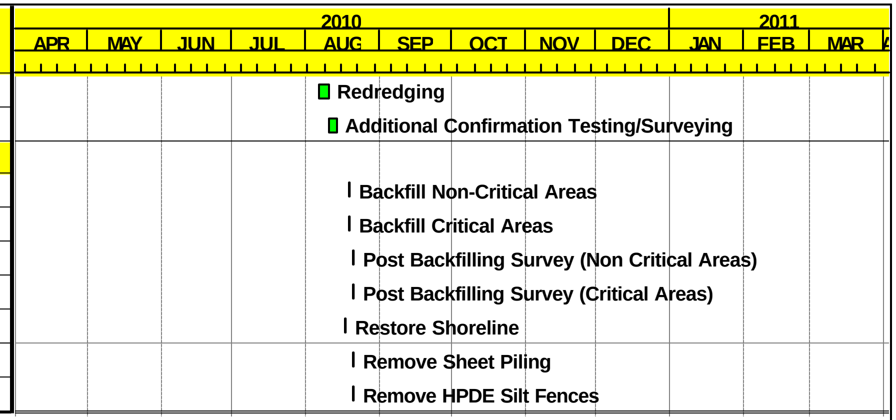
Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
06540	Redredging	3	3	0	07AUG10	10AUG10
06550	Additional Confirmation Testing/Surveying	3	3	0	11AUG10	13AUG10
Restoration						
06570	Backfill Non-Critical Areas	0	0	0	19AUG10	18AUG10
06580	Backfill Critical Areas	0	0	0	19AUG10	18AUG10
06590	Post Backfilling Survey (Non Critical Areas)	0	0	0	21AUG10	20AUG10
06600	Post Backfilling Survey (Critical Areas)	0	0	0	21AUG10	20AUG10
06610	Restore Shoreline	0	0	0	18AUG10	17AUG10
06620	Remove Sheet Piling	0	0	0	21AUG10	20AUG10
06630	Remove HPDE Silt Fences	0	0	0	21AUG10	20AUG10



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Phase II (Year 5)

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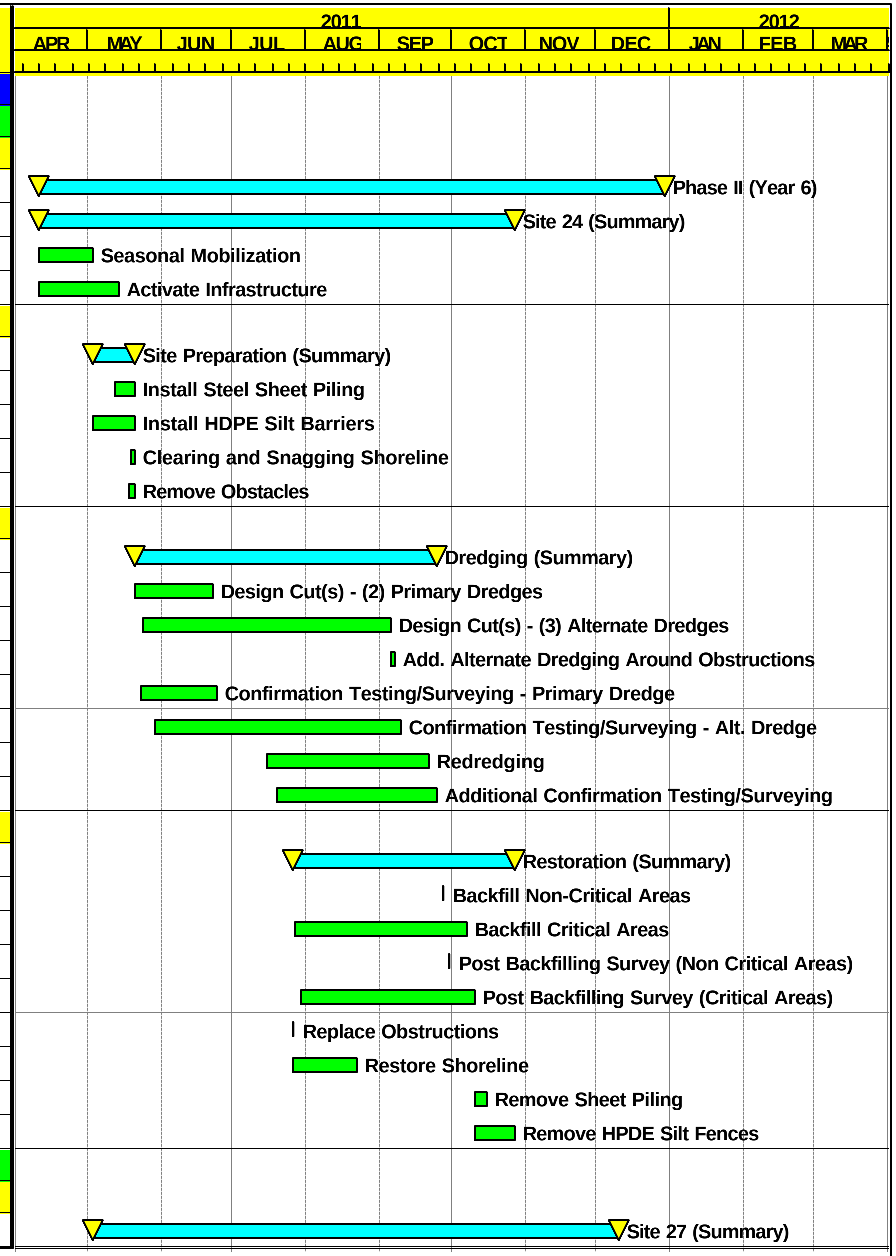
Production Schedule:

Phase 2 (Year 6)

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Phase II						
RM 165.75 - 166.75 W						
Site Summary						
05099	Phase II (Year 6)	226*	226*	0	11APR11	29DEC11
05100	Site 24 (Summary)	172	172	0	11APR11	27OCT11
05101	Seasonal Mobilization	20	20	0	11APR11*	03MAY11
05102	Activate Infrastructure	30	30	0	11APR11	14MAY11
Site Preparation						
05110	Site Preparation (Summary)	15	15	0	04MAY11	20MAY11
05120	Install Steel Sheet Piling	7	7	0	13MAY11	20MAY11
05130	Install HDPE Silt Barriers	15	15	0	04MAY11	20MAY11
05140	Clearing and Snagging Shoreline	1	1	0	20MAY11	20MAY11
05150	Remove Obstacles	2	2	0	19MAY11	20MAY11
Dredging						
05160	Dredging (Summary)	109	109	0	21MAY11	24SEP11
05170	Design Cut(s) - (2) Primary Dredges	28	28	0	21MAY11	22JUN11
05180	Design Cut(s) - (3) Alternate Dredges	89	89	0	25MAY11	05SEP11
05190	Add. Alternate Dredging Around Obstructions	2	2	0	06SEP11	07SEP11
05200	Confirmation Testing/Surveying - Primary Dredge	28	28	0	24MAY11	24JUN11
05210	Confirmation Testing/Surveying - Alt. Dredge	89	89	0	30MAY11	09SEP11
05220	Redredging	58	58	0	16JUL11	21SEP11
05230	Additional Confirmation Testing/Surveying	58	58	0	20JUL11	24SEP11
Restoration						
05240	Restoration (Summary)	80	80	0	27JUL11	27OCT11
05250	Backfill Non-Critical Areas	0	0	0	28SEP11	27SEP11
05260	Backfill Critical Areas	62	62	0	28JUL11	07OCT11
05270	Post Backfilling Survey (Non Critical Areas)	0	0	0	30SEP11	29SEP11
05280	Post Backfilling Survey (Critical Areas)	62	62	0	30JUL11	10OCT11
05285	Replace Obstructions	0	0	0	27JUL11	26JUL11
05290	Restore Shoreline	23	23	0	27JUL11	22AUG11
05300	Remove Sheet Piling	5	5	0	11OCT11	15OCT11
05310	Remove HPDE Silt Fences	15	15	0	11OCT11	27OCT11
RM 163.25 - 164.25 W						
Site Summary						
05760	Site 27 (Summary)	190	190	0	04MAY11	10DEC11



Start Date	18APR05
Finish Date	29DEC11
Data Date	18APR05
Run Date	01APR04 10:22

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HPCB

Sheet 1 of 2

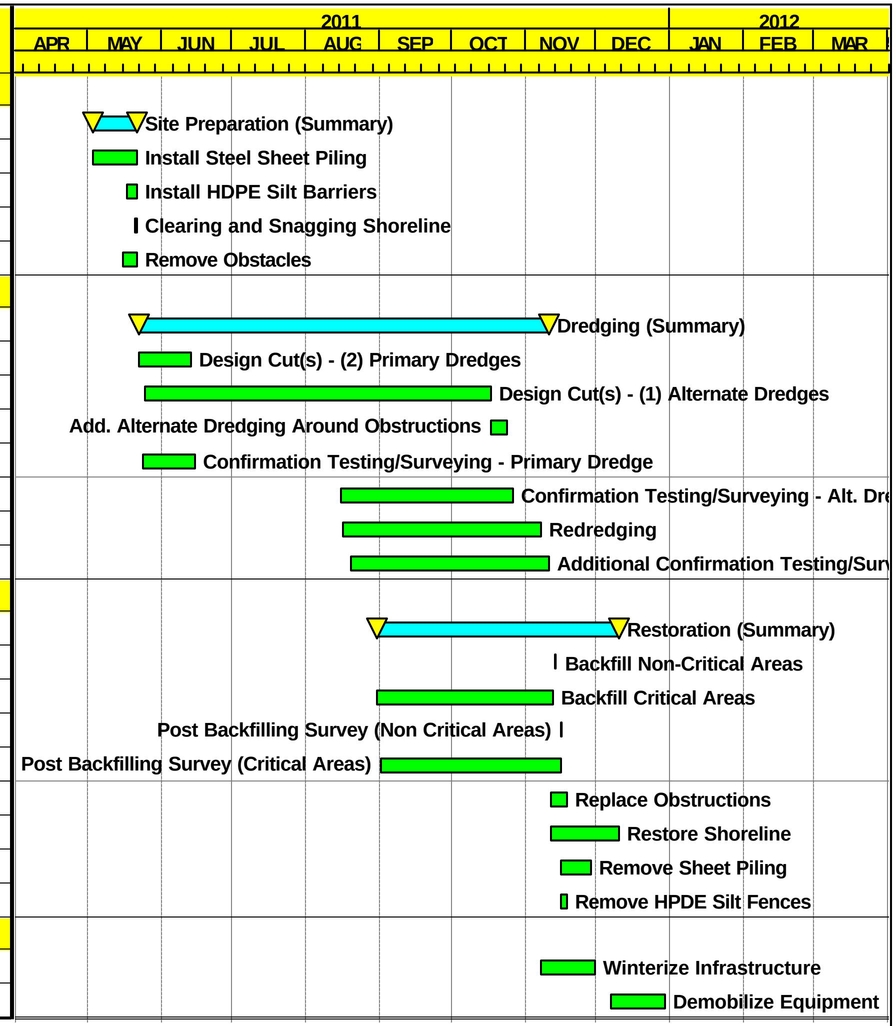
Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 6)

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
Site Preparation						
05770	Site Preparation (Summary)	16	16	0	04MAY11	21MAY11
05780	Install Steel Sheet Piling	16	16	0	04MAY11	21MAY11
05790	Install HDPE Silt Barriers	4	4	0	18MAY11	21MAY11
05800	Clearing and Snagging Shoreline	1	1	0	21MAY11	21MAY11
05810	Remove Obstacles	6	6	0	16MAY11	21MAY11
Dredging						
05820	Dredging (Summary)	148	148	0	23MAY11	10NOV11
05830	Design Cut(s) - (2) Primary Dredges	19	19	0	23MAY11	13JUN11
05840	Design Cut(s) - (1) Alternate Dredges	124	124	0	26MAY11	17OCT11
05850	Add. Alternate Dredging Around Obstructions	6	6	0	18OCT11	24OCT11
05860	Confirmation Testing/Surveying - Primary Dredge	19	19	0	25MAY11	15JUN11
05870	Confirmation Testing/Surveying - Alt. Dredge	62	62	0	16AUG11	26OCT11
05880	Redredging	71	71	0	17AUG11	07NOV11
05890	Additional Confirmation Testing/Surveying	71	71	0	20AUG11	10NOV11
Restoration						
05900	Restoration (Summary)	88	88	0	31AUG11	10DEC11
05910	Backfill Non-Critical Areas	0	0	0	14NOV11	12NOV11
05920	Backfill Critical Areas	64	64	0	31AUG11	12NOV11
05930	Post Backfilling Survey (Non Critical Areas)	0	0	0	16NOV11	15NOV11
05940	Post Backfilling Survey (Critical Areas)	64	64	0	02SEP11	15NOV11
05945	Replace Obstructions	6	6	0	12NOV11	18NOV11
05950	Restore Shoreline	25	25	0	12NOV11	10DEC11
05960	Remove Sheet Piling	11	11	0	16NOV11	28NOV11
05970	Remove HPDE Silt Fences	3	3	0	16NOV11	18NOV11
Demobilization						
06632	Winterize Infrastructure	20	20	0	08NOV11	30NOV11
06634	Demobilize Equipment	20	20	0	07DEC11	29DEC11



Start Date	18APR05	HPCB	Sheet 2 of 2
Finish Date	29DEC11		
Data Date	18APR05		
Run Date	01APR04 10:22		

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Example Production Schedule

Hudson River PCB Dredging

Phase II (Year 6)

Date	Revision	Checked	Approved