

# FINAL REPORT

CONTRACT # 902331

To

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From

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## Demolition Phase

### I. Implementing the Demolition Waste Management Plan

#### A. Demolition Begins

Interior demolition began on the old Sears' building in mid-February, 1992. Metro, Palermini & Associates (P&A) and Hoffman Construction sat down and discussed the implementation of the waste management plan. At this time, Hoffman had put out bids for an exterior demolition contractor and had yet to make the decision whether they would perform the exterior demolition inhouse or contract with a demolition contractor.

P&A attended early Monday morning safety meetings and handed out the Construction Site Recycling Guide. Discussion took place as to the goals of the project and how we were trying to reuse or recycle as many materials as possible during the demolition phase.

During this time, Hoffman began trial source separation of interior demolition materials to determine the cost feasibility as well as ease of dismantling. Examples of some of the initial source separation that took place were: disassembly of metal stud walls, separating metal from previously demolished materials, minimizing concrete removal around window openings, source separating wood and non-ferrous metals, dismantling light fixtures. On numerous occasions P&A talked with the on-site personnel and gave feed-back as to the excellent quality of source separation the contractors were doing.

The dismantling of the light fixtures was one of the most time consuming procedures. But, they had to be source separated to remove the PCB ballasts anyway and the rest of the materials were sent to the tin recycler. The tin recycler was able to take the material with the plastic lens attached and thus saved some time in not having to remove the plastic.

After testing the source separation methodology, Hoffman Construction determined that it was far more cost/effective to continue to source separate than to send mixed loads of materials to the landfill.

But early in the process of source separating miscommunication took place and whole truck loads of drywall wth studs intact was sent to St. Johns for reuse. St. Johns was unable to process the material in that

format. Hoffman then took extra care to separate the studs from the drywall. Care was also taken to preserve large pieces of large bore copper tubing, the larger the piece the higher the market value.

Additionally, drop boxes were strategically placed on site to facilitate source separation. A small "bobcat" was used to haul material from the interior demolition to the drop boxes. These drop boxes were then hauled off by Hoffman's hauler, Metropolitan Disposal Company or (MDC). The drop boxes were only used for the concrete and rubble during the initial stages of the demolition.

In late February, Hoffman selected Allied Construction to do the exterior demolition. Allied, an experienced demolition contractor had been incorporating source-separation and recycling into it's normal business procedures and was very familiar with existing secondary markets. Allied, like Hoffman was almost "fanatical" in the way they source-separated every material. Allied used a crane with a with claw like apparatus that was used to source separate such minute details as copper out of old radiators.

This kind of commitment on the part of the prime contractor and subcontractors was a key factor in the success of the demolition recycling phase.

## B. Tracking the Construction Waste

P&A worked closely with Don Nail, Hoffman's on-site supervisor to develop a tracking form (see Attachment #1) that identified the type, quantity, transportation method and destination for each load that left the site. In addition, Allied provided P&A a list of all loads that they were responsible for hauling off-site. This made tracking of materials during the demolition phase relatively easy since there were only two ways materials would leave the site; through the demolition contractor or through Metropolitan Disposal Company (MDC), Hoffmans hauler. Early in the process, Allied Demolition was consistent in supplying weekly tracking reports. Towards the latter part of the demolition process, it took many phone calls and personal site visits to gather the needed information.

Hoffman construction and the demolition contractor, Allied Demolition. Hoffman agreed to trade all of the interior scrap metal ( HVAC, piping, rebar, light fixtures, etc.) produced by Hoffman's interior demolition in

return for hauling off all the concrete, rubble, bricks etc.also produced from the interior demolition.

By coincidence, Metro was in the process of closing a landfill and needed large quantities of rubble. Metro was paying \$3.44/ton for clean fill to be used in closing the landfill and allowed Allied Demolition to tip the rubble for free. Subsequently, all of the rubble produced, except for 74 tons that contained large pieces of rebar, went to help cap the landfill. In addition other locations that needed clean fill were identified but none proved to be as convenient or as cost effective.

P&A kept a weekly tally of all materials that left the site. Due to both Hoffman's and Allied on-site diligence, and efficient source separation the recycling of demolition debris went very smoothly.

#### C. Beyond Recycling - Incorporating the Reuse of the Building

Again, due to the full cooperation of the on-site superintendent, Don Nail, many interior materials were salvaged and reused for:

- a. Dry shacks (offices). Used 2x4's and sheetrock were used to construct interior office spaces. Wall panels were used for table tops.
- b. Sand from under the hardwood flooring and rubble from the boiler room was used to fill-in the basement floor openings and backfill around the building.
- c. Dirt from subfloors was reused to fill in escalator pit.
- d. Exterior shrubs were removed and re-planted in Vancouver.

In addition to the actual reuse of the building structure, exterior medallions were salvaged and will be used in the new building.

#### E. Developing Waste Management Forms for Subcontractors

Working closely with Hoffman, P&A and Metro developed a waste management form for use by Hoffman's subcontractors. Additionally contract language was developed that delineates the recycling and re-use responsibilities of waste materials produced on-site by contractors.

The waste management form (see Attachment #2) will be an extremely useful tool during the new construction phase. The form should also help the on-site recycling coordinator double-check on the accuracy of the day-to-day waste tracking form used for monitoring each load of waste that leaves the site.

F. It All Adds Up - What Left The Site and Where It Went

P&A provided Metro with bi-weekly reports that documented the type of material, quantity, disposal method and the recycling company or disposal site where the material was taken (see Attachment #3). Primarily the breakdown of materials that were reused, recycled or disposed of at a landfill are as follows:

Material	Quantity
Concrete, Bricks, Rubble	3,999 tons
Scrap Metal	301 tons
Wood	184 tons
Salvage	35 tons
Mixed Solid Waste	132 tons

P&A worked very closely with Hoffman and Allied to track these quantities and also received weekly printouts from St. Johns. Less frequent conversations took place with MDC because of the detailed tracking form filled out by Hoffman on a weekly basis.

## II. CONCLUSION

This project, even more than most required frequent communication, team work and a common goal of waste reduction.

Very few incidents occurred when there was a lack of communication and loads went off site contaminated. In each of these instances, the problem was quickly remedied and solutions developed.

The primary reason the process worked was the fact that only two contractors were involved in the demolition process and as mentioned before, P&A, Metro, Hoffman and Allied looked for every conceivable opportunity to reuse, recycle or salvage materials from the construction

site. Only sending 132 tons of mixed waste to a general purpose landfill is quite an accomplishment on a project of this magnitude.

Another important factor, was the timing and motivation from the client. Upfront, the prime contractor, Hoffman had time to work with his staff to carefully dismantled and source separate materials. Given a faster time-line for demolition, we may have encountered many more "rough" spots during the source separation/demolition phase. One of the most frustrating problems was the timing of the asbestos abatement. The abatement ran at least 8-10 weeks longer than was originally determined. This caused the interior demolition to be held up much longer than was on the original demolition schedule.

As in the first phase of developing the waste management plan (WMP), upfront communication is essential to implementing a successful WMP. Once, P&A and Metro had open lines of communications to the prime contractor it seemed as if all the pieces fell together and the process flowed smoothly.

Understanding the construction process is also a very important key to the success of implementing a waste management plan. It's important to understand each of the subcontractors involved and their special needs and requirements.

### III. RECOMMENDATIONS

Once a waste management plan has been developed, it is important to sit down with all the key players and identify:

- A. Goals or percentages of materials that will be recycled;
- B. How the plan will be implemented. Who will be responsible for supervising the plan.
- C. What tools are needed to implement the plan such as:
  - 1. Explicit contract language to be included into bid packages;
  - 2.. Waste management forms (and subcontractor forms)
  - 3. Tracking forms;
  - 4. Training materials and technical assistance;
  - 5. Special bins or on-site location designated for source-separation and storage of waste materials;

6. Worker incentives.

D. Provide constant feed-back on the success of the projects.