



Final Report - 2008

**WAKE COUNTY, NORTH CAROLINA
C&D WASTE ASSESSMENT
Strategic Review of Quantities
Generated, Processing and Disposal
Capacities, and Recycling Market
Attributes**

for

**WAKE COUNTY SOLID WASTE
MANAGEMENT DIVISION**

**Working in Association with
CITY OF RALEIGH**

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1. GBB's Understanding of Need for Report and Work Scope

- As noted in the County/GBB Scope of Services, GBB is to:
 - Review reported C&D waste generated in the County from FY2003 to FY2007
 - Provide information on the methods of handling C&D waste and related costs
 - Present case studies of successful C&D recycling programs with and without regulatory requirements

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1. GBB's Understanding of Need for Report and Work Scope

GBB Project Timeline

Contract Approved	October 3, 2007
Kickoff Meeting	November 8, 2007
Initial Field Meetings	November 8-9, 2007
Follow-up Field Meetings	November 27-28, 2007
Initial Draft Report Submitted	December 28, 2007
Revised Draft Report (per County comments)	January 28, 2008
GBB Presentation to Wake County SWAC	March 26, 2008

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1. GBB's Understanding of Need for Report and Work Scope

- Three years ago, GBB provided a similar PPT report to the County, including information on the potential impact of a "Draft Construction and Demolition Waste Recycling Model Ordinance" being considered at that time.
- The County chose to delay passage of the ordinance and observe how C&D waste activities developed over time
- This current report addresses additional activities or changes occurring over the past three years and presents trends over a five fiscal year timeframe
- The C&D waste generator options include, at a minimum:
 - Four methods to remove materials from jobsites;
 - Six forms of materials discharge once collected, plus markets for reuse and recycling

Note: A schematic depicting these options is presented on the next page.

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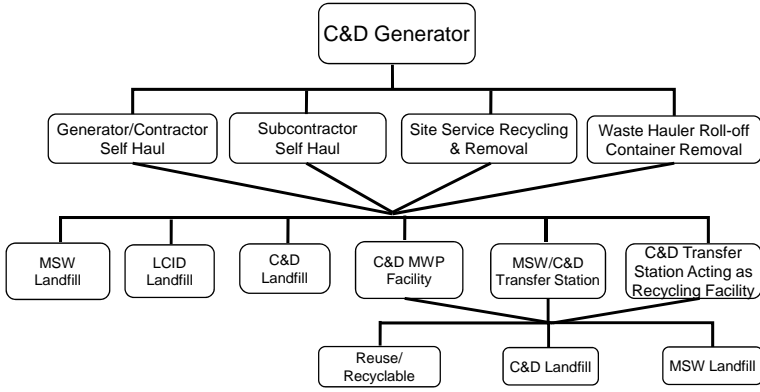




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1. GBB's Understanding of Need for Report and Work Scope



C&D Management System Options



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            graph TD
            A[C&D Generator] --> B[Generator/Contractor Self Haul]
            A --> C[Subcontractor Self Haul]
            A --> D[Site Service Recycling & Removal]
            A --> E[Waste Hauler Roll-off Container Removal]
            B --> B1[MSW Landfill]
            B --> B2[LCID Landfill]
            B --> B3[C&D Landfill]
            C --> C1[MSW/C&D Transfer Station]
            C --> C2[C&D MWP Facility]
            C --> C3[C&D Transfer Station Acting as Recycling Facility]
            D --> D1[Reuse/Recyclable]
            D --> D2[C&D Landfill]
            D --> D3[MSW Landfill]
            E --> E1[MSW/C&D Transfer Station]
            E --> E2[C&D MWP Facility]
            E --> E3[C&D Transfer Station Acting as Recycling Facility]
            
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2. Generated C&D Waste Quantities

- GBB worked with County and NC DENR staff to obtain FY2003 through FY2007 Annual Reports from 17 sites identified as handling Wake County C&D waste during that timeframe
 - Refer to Appendix D for the locations in the County
 - Refer to Appendix E for the listing and tonnages summary


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2. Generated C&D Waste Quantities

- GBB reviewed C&D waste information
- Appendix E highlights the reported quantities disposed at C&D-related sites subject to this project review.
- A histogram of the annual receipts of each C&D facility receiving Wake County C&D wastes is presented in Appendix F.

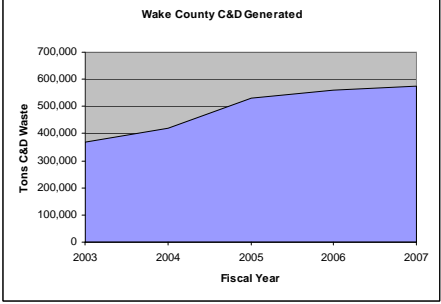
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2. Generated C&D Waste Quantities

Appendix G1-G5 presents tables on each site receiving C&D waste between Fiscal Year 2003 and Fiscal Year 2007 reflecting GBB's opinion on C&D waste quantities generated in Wake County to be as follows:

FY 2003	369,876 tons
FY 2004	420,127 tons
FY 2005	531,448 tons
FY 2006	561,459 tons
FY 2007	575,974 tons




Note: The above tonnages do not generally include C&D waste materials within the MSW stream or the C&D waste received at the LCID landfills in the County.



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2. Generated C&D Waste Quantities

- Construction Spending increased statewide during the same time period, although not at the same rate as reported C&D waste generation in the County

NC Construction Spending vs. Wake C&D Wastes				
FY	Billions	% change	Tons	% change
2002	\$ 17.76			
2003	\$ 18.92	7%	369,876	
2004	\$ 21.47	13%	420,127	14%
2005	\$ 24.55	14%	531,448	26%
2006	\$ 25.11	2%	561,459	6%
2007			575,974	3%


Represents annual % change from previous year.



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2. Generated C&D Waste Quantities

Summary Conclusions on C&D Waste Quantities

- While the State “Annual Reports” are provided by each permitted facility vs. being based on independently audited receipts, GBB suggests this information is the best available information as to the Wake County C&D waste quantities and flows
- Actual C&D waste reported generated for FY 2003 through FY 2005 were significantly higher than the original County Business Plan information for that same period.
- Note: GBB recommends NC DENR modify the annual report format to better qualify C&D materials that are marketed as recycled and C&D materials sent to LCID facilities.
 - Since all types of facilities (MWP, Transfer, and Landfill) may be engaged in recycling or redirecting activities, space should be provided asking for detail on types of materials, tonnages, and ultimate disposition
 - “Recycling” needs to be defined vs. facility simply not directing material to C&D landfill




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3. C&D Waste Landfilled vs. Reused/Recycled

- GBB interviewed many major participants in the Wake County C&D business sector, as well as reviewing the State Annual Reports for Fiscal Years 2003 through 2007.
- GBB compiled a facility-by-facility review (See Appendix G) of Fiscal Years 2003 through 2007 which reflects the following summary results:

Wake County C&D Tons		
FY	Recycled	Landfilled
2003	53,755	316,122
2004	91,374	328,753
2005	99,833	431,615
2006	93,864	467,594
2007	89,403	486,571



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3. C&D Waste Landfilled vs. Reused/Recycled

- C&D Waste Recycling and Disposal changed at very different annual rates over the study period


Annual % change, as reported		
FY	Recycling	Landfilled
2004	70%	4%
2005	9%	31%
2006	-6%	8%
2007	-5%	4%

Overall % change 2004-2007
-2% 48%

Note: Represents annual % change from previous year.




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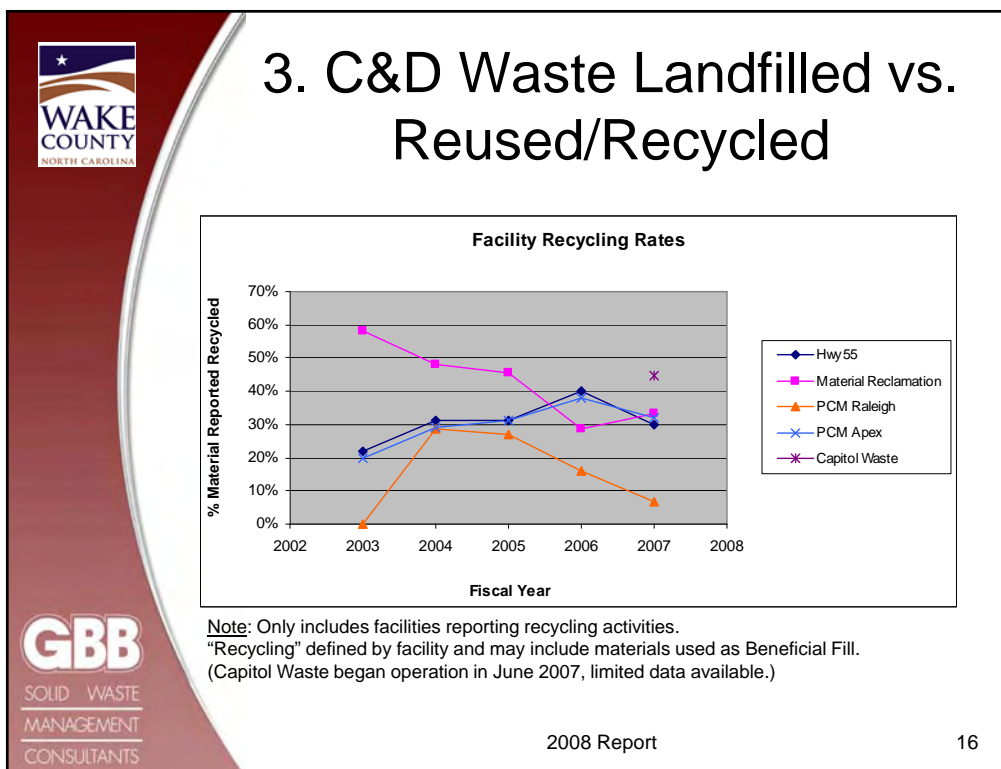
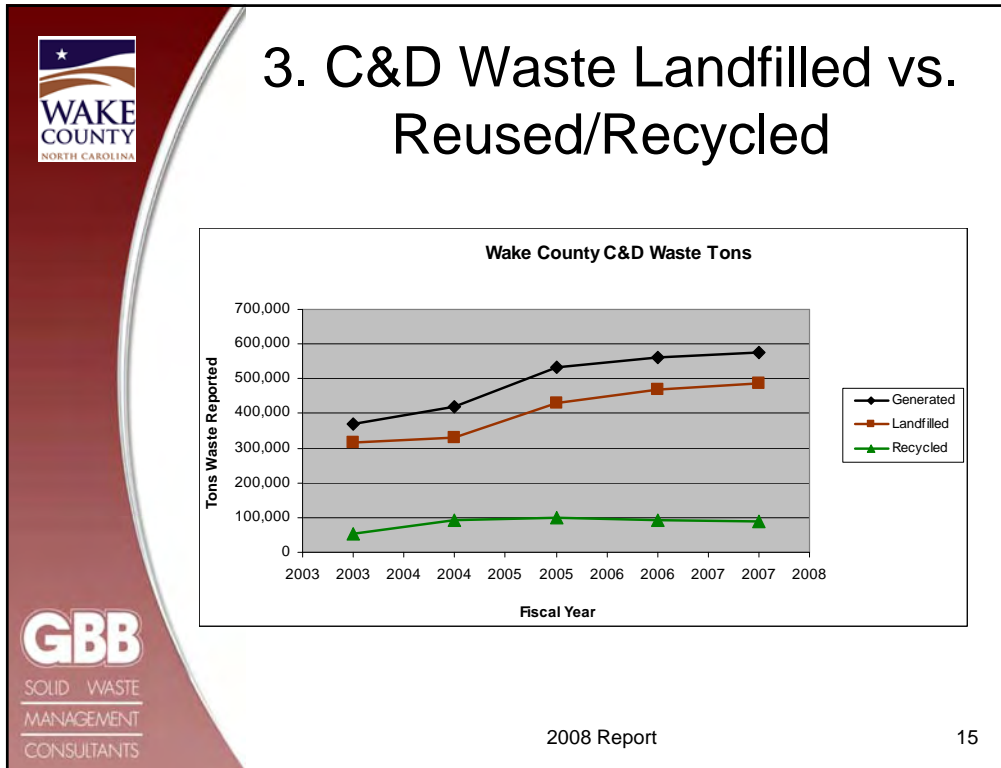
3. C&D Waste Landfilled vs. Reused/Recycled


- GBB estimates the annual recycling rates of all C&D waste generated in Wake County to be:

Wake County C&D Tons		
FY	Generated	Recycling Rate
2003	369,876	15%
2004	420,127	22%
2005	531,448	19%
2006	561,459	17%
2007	575,974	16%



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4. C&D Capacity Review

Over the last five-year period:

- Since 2004, the County-wide C&D Waste Recycling Rate has declined from a 22% high in 2004 to the current 16% in 2007, based on the DENR reporting methodology.
- The number of C&D Recycling facilities has essentially remained constant (until just recently)
 - Two C&D Landfills closed in FY 04
 - Two C&D Landfills opened in FY 04
 - One C&D Landfill closed in mid FY 07
 - One new C&D Transfer Station opened at the end of FY 07
 - One new C&D MWP facility permitted to construct at the end of FY 06

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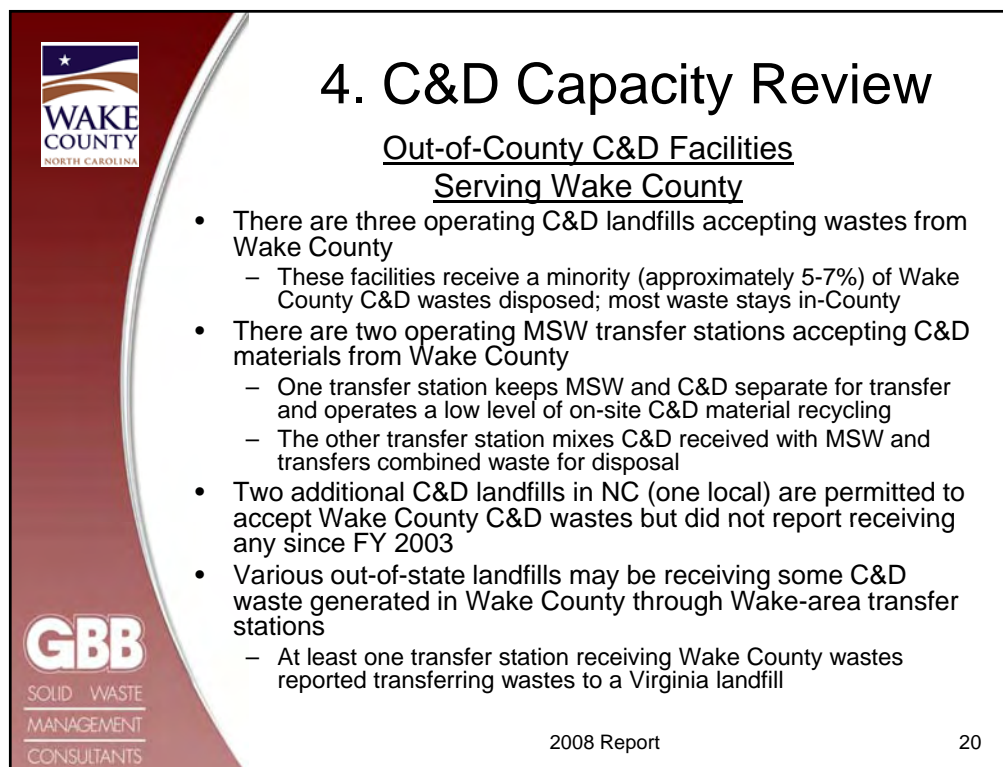
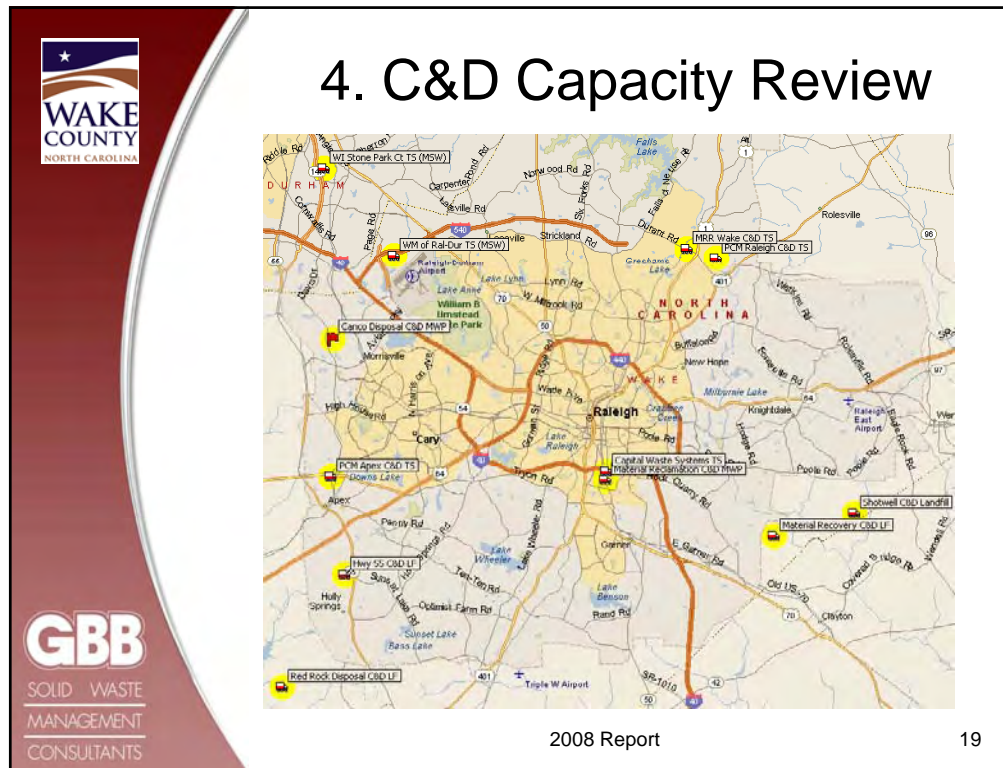
4. C&D Capacity Review


C&D Facilities Located in Wake County

- There are four operating C&D landfills
 - Two have recently applied for expansion of disposal area
- There are four operating C&D transfer stations
 - One in Apex
 - Two in North Raleigh
 - One in South Raleigh
 - All four transfer stations have implemented some level of on-site waste separation and recycling
- There is one C&D MWP recycling facility located in South Raleigh
- Another C&D MWP facility has received a permit to construct in Morrisville but is not yet operational

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4. C&D Capacity Review

In-State Facilities Serving Wake County- Permitted Capacity


Facility Name	Comments/Timeframe	Overall Permittable Capacity Yd ³ C&D	Current Permitted Capacity Yd ³ C&D
Hwy 55 Landfill (Permit No. 9230)	89 acres; Permit to operate issued - 12/27/02 Phase 2 Construction Plan submitted to DENR on 9/11/07	2,828,400	858,000
Materials Recovery C&D Landfill (Permit No. 9231)	200 acres; Permit to operate issued - 1/24/03 for North Unit only	5,582,124 North <u>191,548</u> South 5,773,672 Total	1,429,000
Red Rock Disposal/WI (Permit No. 9228)	227 acres; Permit to operate issued - 11/19/01	18,992,799	2,804,235
Shotwell C&D Landfill (Permit No. 9226)	67 acres; Permit to operate issued - 8/30/01 Phase 2 Permit to operate issued 6/19/07	1,025,000	690,000
Coble's C&D LF (Permit No. 0105)	Permit to operate issued - 1/24/02 on 7 acres (total site capacity 39.6 acres)	365,303	177,657
WI-Sampson Co. C&D LF (Permit No. 8202)	Permit to operate issued - 1/24/02 on 7 acres (total site capacity 39.6 acres)	2,035,000	478,000 (Ph. 1) <u>422,000</u> (Ph. 2) 900,000 Total

Note: See Appendix H of this report for more information; does not include Granville County C&D Landfill which consistently received less than 100 tons per year from Wake County.



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4. C&D Capacity Review

Main Facilities Serving Wake County- Estimate of Site Capacity

Facility Name	Calculated TPY	Cubic Yards Permitted ^(A)	2004 Calculated Maximum Site Capacity (Tons)
Hwy 55 Landfill (Permit No. 9230)	97,240	858,000	2,121,300
Materials Recovery C&D Landfill (Permit No. 9231)	314,600	1,429,000	6,355,484
Red Rock Disposal/WI (Permit No. 9228)	572,000	2,804,235	19,370,490
Shotwell C&D Landfill (Permit No. 9226)	77,000	690,000	615,000


A = Based on 5-year increment when the state permit was issued

Note: See Appendix I of this report for more information.



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4. C&D Capacity Review

Projection of Existing Capacity Useful Life

- Wake County current annual C&D generation estimated at 550,000 to 600,000 tons
- At 16%-17% reuse/recycling, the annual disposal capacity requirement is estimated at approx. 460,000 to 480,000 tons (assume 470,000 TPY)
 - If total “In-County” capacity was assumed used by Wake County at 100% level, the 32.2 million tons of projected C&D landfill capacity would last more than 68 years.
 - If total “In-County” capacity is used 75% by Wake County, the useful life would be 51 years.
 - If Wake County recycling increased to 30% of all C&D generated (currently doing 16-17%) and used 75% of projected capacity, the useful life, at a nominal 400,000 TPY of disposal requirement, would be 60 years.

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5. C&D Management Facility Costs


Summary of Current Costs


(Includes C&D Landfills, MWP Facilities and Transfer Stations)

- Based solely on “Posted Gate Rates,” in FY2003, over 370,000 tons of C&D waste were handled at a weighted average “first service provider” disposal charge of \$28.64/ton (see Appendix J) and a “mean cost” of \$25/ton.
- Based solely on “Posted Gate Rates,” in FY2007, almost 590,000 tons of C&D waste were handled at a weighted average “first service provider” disposal charge of \$30.78/ton (see Appendix J) and a “mean cost” of \$30/ton.
- Over four years, this represents an increase of 220,000 tons of C&D, or an additional 60%, of annual C&D waste and a rise of \$2.15/ton in disposal charges, an additional 7%, with a mean increase of \$5/ton (a 20% total increase over 3-year period).

Note: These costs do not address any possible negotiated “deals,” including volume discounts, nor any source separated materials accepted at a lower fee than the Posted Gate Rate.

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5. C&D Management Facility Costs


Potential economic impact of C&D Regulations

- C&D recycling requirements mean more equipment and labor, as well as double handling of all of the material, albeit recyclables or residue. If C&D recycling regulations were passed, GBB would expect the average cost to increase at least \$5-\$10 per ton, as less expensive landfills become “secondary” receivers of material and existing/new recycling centers compete for larger market share.
- Certain C&D waste generators are already participating in recycling, hauling to recycling plants currently charging in the mid-to-high \$30’s/ton, while C&D landfills average fees in the high \$20/ton.

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Note: These costs do not address any possible negotiated “deals,” including volume discounts, nor any source separated materials accepted at a lower fee than the Posted Gate Rate.

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5. C&D Management Facility Costs

Potential economic impact of C&D Regulations

- Almost 235,000 tons of the 576,000 tons generated in Wake County in FY 2007 were handled at either the Material Reclamation or PCM facilities where separation of certain recyclables occurs. Therefore, it appears that 40% of the Wake County C&D waste already incurs “above average” tipping fee costs and experiences some separation for the recovery of some recyclable materials.
- It is acknowledged that in addition to first cost (i.e., tipping fees), the geographic location of any C&D disposal site is also critical to the use of the site by local collectors, particularly in light of the recent fuel price increases. Driving farther for a lower tipping fee becomes less economical with higher fuel costs.
- Also, the normal site conditions (e.g., turnaround time for the trucks) at any C&D disposal site affects usability by haulers. Trucks waiting in queue to dump at a crowded/inefficient location is an uneconomical use of personnel and equipment.

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5. C&D Management Facility Costs

- Some C&D landfills receive a majority of their wastes from other “intermediate” C&D waste handling operations
- Other facilities receive 100% of their deliveries directly from waste generators and/or haulers
- The % material hauled to facilities by users other than major C&D waste operators, such as Transfer Stations or MWP’s, is presented below

Direct Haul C&D Material to Landfills					
Wake County Facility	2003	2004	2005	2006	2007
Material Recovery C&D LF	N/A	18%	26%	15%	26%
Red Rock Disposal C&D LF	32%	28%	39%	41%	39%
Hwy 55 C&D LF and Recycling	100%	97%	97%	100%	100%
Shotwell C&D LF	100%	100%	100%	100%	100%
Holly Springs C&D LF (Now Closed)	98%	94%	100%	85%	100%

Note: 100% indicates all C&D waste hauled directly to landfill without first traveling through interim transfer or processing.




6. Other Local C&D Activities

Demolition Wastes:

- In 2005, GBB spearheaded a survey by the National Demolition Association (NDA) of member contractors nationwide to learn about their demolition debris generation rates & recycling practices
- 555 NDA Members were sent the Survey
 - Almost 20% Level of Participation
 - (Only 2 North Carolina firms returned Surveys)







6. Other Local C&D Activities

Demolition Wastes:

- Based on weighted responses to the NDA Survey, the results were:
 - Total Demolition Debris Generation nationwide is estimated to be:
 - 115 million Tons per Year
 - National Demolition Debris Recycling Rate estimate calculated:
 - 73% Demolition Debris Recycling
 - Some states were calculated to have recycling rates as high as 90% for their demolition debris

Source: GBB, Status of NDA Demolition Debris Generation & Recycling Survey Evaluation, September 2005.
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6. Other Local C&D Activities

Demolition Wastes:

Constituent Material in Demolition	% by Material, of Total Recycled Demolition Wastes
Concrete	61.2
Asphalt Pavement	23.9
Metals	8.4
Brick/Block	4.5
Wood	3.1
Other Materials	1.1
Mixed Stream	<1
Sheetrock	<0.5
Total	100%

Source: GBB, Status of NDA Demolition Debris Generation & Recycling Survey Evaluation, September 2005.
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6. Other Local C&D Activities

Demolition Wastes:

- Local Wake County demolition industry representatives reported a 60% recycling rate for their demolition debris
- Based on local industry estimates, 50,000-100,000 tons per year of inert materials are also crushed and used on site at demolition projects
 - This material is not currently captured by any required annual reporting

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6. Other Local C&D Activities

LCID Facilities:

- Five LCID Landfills are permitted in the County
- LCID Facilities are permitted to receive inert debris such as concrete, brick/block, asphalt, stumps, wood, trees, and brush
- LCID material can encompass a significant portion of construction and/or demolition wastes
- Some LCID facilities process these materials into usable products
 - Grind wood for mulch/fuel
 - Crush rubble materials for aggregate
 - Re-blend asphalt back into pavement
- Wake County was given the responsibility by the State to inspect these facilities and review their operation plans. As of January 1, 2008, this responsibility has reverted back to the State.
- LCID facilities are currently under no State or local obligation to report on amounts of materials received
 - LCID waste types and quantities processed, recycled, or disposed could be captured through requiring reporting from facilities


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6. Other Local C&D Activities

Treatment & Processing Facilities:

- Only one T&P facility is permitted in Wake County and reports annually to DENR
 - Produces wood chips for boiler fuel
 - Facility is also a permitted LCID
- Other LCID facilities seem to engage in similar processing activities, however, no other T&P permits are active in Wake County
 - If these other processing activities were classified and permitted as T&P facilities, DENR and the County would receive data on additional C&D-related materials that are recycled
 - Facility reporting of LCID data could assist in gaining this information




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6. Other Local C&D Activities

County C&D Waste Management Plan:

- Wake County requires a Construction and Demolition Debris Waste Management Plan to be submitted with building permit applications
 - For residential construction over 1,200 sq. ft. or commercial construction costing more than \$100,000
 - Section I- details Project Information and Construction Debris Waste Hauler
 - Haulers used must be County licensed
 - Section II- (currently optional) asks for Construction Debris Material Handling information
 - Information on material handling methods not cataloged for any further use at this time
 - Form provided in Appendix L for reference




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7. Opinion on Markets for C&D Materials

- Waste tonnages and potential rate will vary depending on the definition given to C&D Wastes targeted for recycling, recovery or diversion
- Based on the prior County Draft Model Ordinance, the four Target Materials were Scrap Metal, Cardboard, Concrete/Brick/Block, and Clean Wood
- Other potentially recoverable C&D waste components include salvaged building materials, drywall, carpet, asphalt shingles, and mixed plastics



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7. Opinion on Markets for C&D Materials

- Scrap Metals continue to enjoy increasing market prices and are readily recycled by construction and demolition contractors
 - Local scrap industry representatives estimate between 13,000 and 18,000 tons per year of scrap metal are recycled directly from C&D contractor sources, (e.g. demolition contractors) depending on markets
 - This does not include scrap metal delivered from C&D recycling or transfer facilities
 - Note: These tonnages are not currently included in any annual facility recycling reports required by DENR
- Cardboard also retains positive market pricing and various methods of collection, hauling, and buy-back exist for C&D contractors to take advantage of, in addition to landfill bans prohibiting disposal
- Concrete/brick/block can easily be absorbed in the current recycling market for inert/rubble materials




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7. Opinion on Markets for C&D Materials

- New Clean Wood Waste markets have developed and/or expanded to allow acceptance of a wider range of materials from a wider service area, including the chipping and burning of C&D wood wastes as a boiler fuel product
 - While boiler fuel may not command a positive market price, it only requires management and/or processing by the C&D facility and does not incur transportation or disposal costs once received/processed by the C&D facility
 - Whether these boiler fuel of markets count toward Recycling goals and rates is a decision for the County
- Pallets will increase at C&D waste facilities as they are banned from MSW LF disposal beginning in 2009.
- Markets exist to handle continued growth in recovered wood waste. The issue is not one of constraints associated with market demand, but rather the economic value of the material.




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7. Opinion on Markets for C&D Materials

- Reused or Salvaged Building Materials have limited markets
 - Habitat for Humanity of Wake recently completed an enlarged Reuse store
 - No other significant reuse/salvage businesses exist
 - Residential materials enjoy reasonable markets, Commercial materials do not
 - Residential users flexible, Commercial require quantity
 - LEED, Historic, Do-It-Yourself projects drive markets
 - Significant hurdles exist in wait-time for deconstruction/salvage services
 - Not enough deconstruction service providers
 - Demolition/Construction timing not allow deconstruction
 - Implementing wait-time requirements after obtaining permit but prior to allowing demolition action could help foster deconstruction activities
 - Need to educate the limited number of repeat demolition contractors working in the County




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7. Opinion on Markets for C&D Materials

- Drywall scrap has been a somewhat troublesome material to market; recyclers seem to “come and go”
- Wake County did stockpile drywall for recycling at the North Wake Multi-Material Recycling Facility until 2003
 - Space, contractor, and competition contributed to end
- Recent drywall recycling activities have expanded and upgraded in the State
 - Markets exist in neighboring county and beyond
 - Eager to increase material intake from Wake area
 - Tip fee is charged for material acceptance
 - Transportation can be arranged
 - Outside storage may not be a problem
 - Material may not need separation from clean wood wastes
- Grant funding may be an option to encourage the development of a drywall recycling segregation, consolidation, and transfer operation in the County




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7. Opinion on Markets for C&D Materials

- Carpet and Carpet Padding are recent possible additions to C&D Waste Recycling programs
 - One C&D transfer station is segregating carpet materials for shipment to regional recyclers
 - Another C&D waste processor has discussed cooperating on this program
 - Markets should be tested and solidified before this material should be counted on for C&D waste diversion/recycling
 - Most likely markets out-of-State





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7. Opinion on Markets for C&D Materials

- Asphalt Shingles and other Roofing Material do not appear to have stable markets in most areas of the country
 - A few processors use the material in industrial incinerators or for power generation
 - This material cannot be relied on to add tons to a C&D Waste Diversion/Recycling Program
 - A national Asphalt Shingle Recycling Forum was conducted by EPA/CMRA in Chicago on November 1-2, 2007 and attracted over 200 attendees, showing a strong interest in the subject.
- Mixed C&D plastics, including sheet plastics and rigid plastics such as buckets and pipe, are also in need of stable markets before reliable recycling/diversion of these materials can be achieved


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8. Summary Conclusions

- Currently, 14 sites (with 9 sites in Wake County) are available for C&D waste haulers to discharge their collected materials (7 landfills plus 7 transfer station/recycling sites). Reducing the number of drop-off locations will increase certain customers' haul costs and impact collection logistics/time of service.
- Currently, C&D landfill capacity is extensive (estimated to have over 26 million tons currently permitted) and additional capacity in the DENR permitting process.
- At this time, the "lack of landfill space" is not a motivating factor to push C&D recycling.



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8. Summary Conclusions

- All major C&D waste entities in the County are vertically integrated into more than one portion of the C&D waste business, helping to control their costs and provide materials movement advantages in their service area.
 - Two in-County C&D recyclers also own C&D landfills
 - One also owns a C&D transfer station and hauling business
 - Two C&D haulers also own C&D landfills
 - One C&D hauler recently opened a C&D transfer station
 - One C&D hauler is in permitting for a C&D MWP
 - One Construction contractor operates two transfer stations
- Technically, it is possible for the Material Reclamation MWP Facility to operate on a second shift and provide additional C&D waste recycling capacity.
- Other facilities currently recycling could increase efforts without significantly expanding operations.


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8. Summary Conclusions

- At some point during the last five years, in absence of any local regulation, each of the 5 facilities reporting some form of C&D recycling activities has generally achieved a recycling rate of approximately 30% or more
 - Accounting for waste generation differences and market conditions, this rate appears at least attainable
 - 30% recycling rate was not maintained by all facilities, reasons uncertain; possibly-
 - Material market changes
 - Facilities stop separating low market material(s)
 - Generator separates high market material(s) and sell directly to market, never counted by annual facility data
 - Reporting structure not regulated
 - Facilities define material separated for “Recycling,” could include “lower-level” recycling activities (e.g. Beneficial Fill, ADC)


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8. Summary Conclusions

- Any regulatory action by Wake County regarding C&D Recycling will lead to some increased C&D waste management and handling costs.
- As requested for reference, GBB reviewed various communities with Regulatory and Non-Regulatory C&D Waste Recycling Programs
 - Information on these Case Study communities and their programs are provided in Appendix M.




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8. Summary Conclusions

- Due to the variety of different C&D collection systems, transfer/processing plants, and newly licensed disposal sites, the current marketplace is highly competitive with several alternatives, which keeps disposal costs generally low.
- If current C&D recycling operators at C&D MWP/TS locations become the “processor by regulation,” the lower cost landfills will see less “direct haul” usage and be forced to consider opening their own recycling plants to maintain a market share. This will most likely add costs to the system.



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8. Summary Conclusions

- C&D waste generation will continue, regardless of any regulation
 - C&D landfills are difficult to site now, and will likely become more difficult in the future
 - Any space saved now will still be available for later
- C&D waste recycling regulation will likely add some cost to the system
 - C&D recycling also adds opportunity and options to the system and economy
- C&D recycling would further Wake County's current Environmental Stewardship Agenda
 - Shows good faith effort to achieve State's forty percent (40%) municipal solid waste reduction goal






Appendix M: Case Study Communities

Regulatory C&D Waste Programs


- A. San Jose, CA (long-standing regulation)
- B. Woolwich Township, NJ (new regulation)
- C. Metro Portland, OR (pending regulation)

Non-Regulatory C&D Waste Programs

- D. St. Lucie County, FL (public facility)
- E. New Bedford area, MA (private facilities)
- F. King County, WA (incentives, education)




2008 Report- Appendix M 1




Case Study Community: Wake County, NC

- Population Estimate
 - 817,500 (2007)
- C&D Waste
 - Generated = 575,974 tons (FY 2007)
 - Recycled/Rate = 89,403 tons/15.5% (FY 2007)
 - Disposed = 486,571 tons (FY 2007)
- C&D Waste Tipping Fees
 - \$24-39.50/ton
 - All Private Facilities
- MSW Tipping Fees = \$29.50/ton, Public
- One Partial County FTE for C&D
 - No formal C&D Waste Program




2008 Report- Appendix M 2




Case Study: San Jose, CA

- Initial Regulations Enacted 2001
 - Needed to meet State 50% recovery goal
 - Pay Deposit w/each Building Permit
 - Based on \$ per square foot
 - Deposit refunded if wastes delivered to “certified” facilities for recovery and documentation submitted
- “Certified” Facility Recovery Requirements
 - Inert Debris Facilities minimum 90%
 - Mixed C&D Waste minimum 50%




2008 Report- Appendix M 3




Case Study: San Jose, CA

- 1998 Waste Characterization Showed 30% Waste as C&D
- With Ordinance Activity, Current City C&D Recovery Rate = 83% via facilities
 - Over 1.3 million Tons diverted in FY 06/07
- All Facilities Receiving C&D Wastes Are Privately Owned/Operated
 - C&D Tipping Fees = \$65-75/ton
 - Facility Recycling Rates range from 52-100%
- MSW Tipping Fees = ~\$70/ton, Private




2008 Report- Appendix M 4




Case Study: San Jose, CA

- Recent City Survey of User Satisfaction:
 - Program well received, supported
 - About ¾ were satisfied and felt process easy
 - 2/3 felt deposit amount reasonable
 - Less than half deposits have been refunded
 - Unaware of refund cited by over 25%
 - Contractor pays deposit and charges owner
 - Owner unaware that this was not a Fee
 - City addressing in “catch-up” effort
 - Also enhancing information/publicity of deposit refund
- 2006 City population ~ 929,900
- City staff devote 3 FTE to Program
 - Position funded with State monies allocated to jurisdictions from SW/Recycling Bill (AB939)




2008 Report- Appendix M 5




Case Study: Woolwich Township, NJ

- Newly Effective Regulation, April 2007
 - Requires Construction and Demolition projects achieve 65% recycling of wastes by weight
 - Needed to meet State-wide goal of 60% recycling
- Projects complete a pre- and post-project waste and recycling estimates
 - Projects submit supporting waste documentation at end
 - Projects have yet to complete new process
 - Penalties for non-compliance include increasing fines
 - Ordinance allows withholding of permit for non-compliance
- Includes allowance for waste segregation “compounds” in new subdivisions to consolidate waste materials from all new structures




2008 Report- Appendix M 6




Case Study: Woolwich Township, NJ

- Population ~3,000 (2000 Census)
- Township employs one FTE who spends about 1/3 time on all waste/recycling program duties
 - Time required will likely increase as program matures
 - Provides C&D waste recyclable market information to permit applicants
- C&D Tipping Fees = \$50-77/ton
 - Public facilities in and outside jurisdiction
- MSW Tipping Fees = \$77/ton, Public
- In addition to C&D Landfills, some Sorting/Recycling facilities exist
- Marketable materials also include drywall and vinyl siding
- Inert materials directed to secondary markets rather than disposal facilities




2008 Report- Appendix M 7




Case Study: Metro Region, OR

- Regulations Effective July 2009
 - Use to meet State 64% Recycling Goal
 - Many facilities were recycling, others not
 - 2 year lead time to allow facilities to upgrade operations for recycling
 - Ordinance under development with research committee since 2003
- Aimed at Waste Disposal Facilities
 - Forces material to undergo processing prior to disposal
 - Not enforced at individual permits/projects
 - Contractors potentially see no difference in waste practices
- Target Materials
 - Wood, Cardboard, Metal
 - Must be <15% of residual for disposal




2008 Report- Appendix M 8




Case Study: Metro Region, OR

- **C&D Waste Generation**
 - Approximately 250,000 tons/year
- **C&D Recycling Rate = 40-50%**
 - Does not include concrete inert material
 - Most concrete to aggregate not LCID
 - State goal not include concrete inert either
 - Stumps/organics ARE included in recycling
- **C&D Tipping Fees = \$50-70/ton**
 - Include \$24/ton fee charged by Metro for SW program funding
 - Estimates indicate ordinance may add up to \$9/ton to mixed load tip fee costs
- **MSW Tipping Fees = \$70/ton, Public**
 - Include \$24/ton fee charged by Metro for SW program funding




2008 Report- Appendix M 9




Case Study: Metro Region, OR

- **Region population ~ 1.3 million**
 - Region includes 3 counties and 25 cities
- **1 FTE dedicated to C&D program currently, plus some contractor work**
 - Funding provided by replacing current program and small (\$.01) tax increase
- **Program also operates networking website for reuse exchange of used/leftover commercial building materials**
- **City of Portland independently requires C&D project material recycling since 1996**
 - Affects projects with >\$50,000 permit value
 - Targets recycling of wood, cardboard, metal, rubble, and land-clearing debris




2008 Report- Appendix M 10




Case Study: St. Lucie County, FL

- County operates Public C&D waste separation/recycling plant
 - In cooperation with County landfill
 - First publicly operated C&D waste plant
 - Second recently opened in Virginia (with GBB assistance)
- Program began in June 2004
- C&D Tipping Fees = \$19/ton
 - Local private facilities reduce fees to meet County price for competition
- MSW Tipping Fees = \$32/ton, Public
- Processing costs = \$6.80/ton
 - Includes equipment, processing, labor, O&M




2008 Report- Appendix M 11




Case Study: St. Lucie County, FL

- C&D Waste Received
 - 600 tons per day (186,000 tons per year)
 - Increased to 1,200 tons per day for hurricanes
- Facility Recycling Rate = 80%
- Recoverable Materials Separated
 - Metals, cardboard, wood, rigid plastics, drywall, dirt
 - Markets sought for all materials, regardless if revenue positive, revenue neutral, or just general cost savings (Noticed private facilities only entertaining revenue markets for recyclable materials)
 - County secured contracts with existing material markets, including committing to build facilities, before finalizing plant design
 - Designed facility around existing markets but created flexibility for later changes/modifications
 - No markets for MSW, Roofing Materials, and Insulation




2008 Report- Appendix M 12




Case Study: St. Lucie County, FL

- County Population ~252,700
- 3 County FTEs run C&D plant
 - Plant foreman and 2 equipment operators
 - Plus 10 contracted workers to sort/cleanup
 - Enterprise fund structured program
 - Staff researched options for 2 years, including visits to similar facilities
 - Facility will be used to process materials unearthed in mining current County C&D landfill




2008 Report- Appendix M 13



Case Study: New Bedford area, MA

- No Public C&D program
 - Public programs refer C&D to private markets
- MSW Tipping Fees = \$75-115/ton, Public/Private
- Private C&D Recycling Processors
 - Largest facility opened in 2002
 - Permitted at 1,500 tons per day
 - Currently receiving 500
 - down from 1,100-1,300 in years past
 - C&D Tipping Fee \$110/ton
 - Facility Reported Recycling Rate = 90-95%
 - Includes over 60-70% fines for ADC
 - Also operates MSW Transfer at same facility
 - Smaller facility recently opened nearby
 - 250 tons per day
 - C&D Tipping Fee ~\$90/ton




2008 Report- Appendix M 14




Case Study: New Bedford area, MA

- County Population ~546,000
- Prior State bans prohibit yard waste and cardboard disposal
- New (2006) State bans prohibit asphalt, brick, concrete, metal, and wood disposal
 - Wood allowed for combustion
- C&D facilities recycled materials
 - Wood, metal, cardboard, aggregate, and fines for ADC
 - Gypsum market changing
 - Segregates clean loads for recycling
 - “dirty” loads transferred to another sorting recycler
 - Plant flexible to react to market changes as needed




2008 Report- Appendix M 15




Case Study: King County, WA

- C&D Wastes Banned from County Transfer Stations
 - Exceptions for pick-up truck hauling and <10% loads
- County Contracts with 2 Private Transfer Companies to Accept C&D Wastes at several Transfer Facilities
 - Contracts Include Incentives for C&D “Diversion”
 - Facilities report “Diversion” rates monthly
 - Rate only includes loads delivered for “Diversion”
 - “Recycling-Compliant” facilities must maintain 40% rate
 - Transfer Facility rates range between 0% and 49% to 96%
 - Incentives do not seem effective (staff assessment)
 - Some transfer facilities not “Recycling-Compliant”
- Private C&D Recycling Facilities also operate in the region
 - Recycling Facility C&D recycling rates reported at 99%
 - These recycling rates include ADC markets
- “Diversion” includes True Recycling, use as Boiler Fuel, and use as Alternate Daily Cover (ADC)




2008 Report- Appendix M 16




Case Study: King County, WA

- C&D Tipping Fees \$85-92.50/ton
 - MSW Tipping Fees = \$95/ton
- C&D Waste Generation and “Diversion”
 - 2001: 774,000 tons, 66% “Diversion”
 - 2006: 1,057,000 tons, 80% “Diversion”
- Diverted C&D Materials ~90% Inerts
- C&D Materials Landfilled ~5% Inerts




2008 Report- Appendix M 17



Case Study: King County, WA

- County C&D Program Started 2001
- 0.7 FTE assigned to C&D Program
 - Funded through tipping fees to SW program
- Staff Provides Education to Construction Waste Generators
 - Web site of tools and information
 - Classes/seminars through builder groups
- Significant Influence of LEED Projects
- County Currently Considering Options for Upgrade of C&D Recycling Program
 - Possibly including bans/ordinances



2008 Report- Appendix M 18



Case Study Information: CIWMB C&D Regulations

- California Integrated Waste Management Board developed a model C&D Diversion Ordinance for modification and use by jurisdictions
- Web site also provides sample documents from CA communities enacting some type of ordinance, contract language, or permit condition regulating C&D wastes
- www.ciwmb.ca.gov/ConDemo

