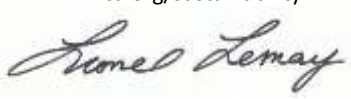
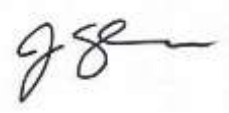
Environmental
Product
Declaration

OZINGA®

Ozinga Ready Mix Concrete

EPD for ready mix concrete produced at four Ozinga facilities in Illinois and Florida

NRMCA Certified Environmental Product Declaration

Declared Product:	Ready-mixed concrete produced by Ozinga Ready Mix Concrete	
Date of Issue:	March 26, 2020	
Period of Validity:	5 Years	
EPD Number	NRMCAEPD: 20032	
Declaration Owner:	**Ozinga Ready Mix Concrete, Inc.** 19001 Old LaGrange Road, Ste 300 Mokena, IL 60448 concrete.ozinga.com	OZINGA
Program Operator:	**National Ready Mix Concrete Association** 66 Canal Center Plaza, Suite 250 Alexandria, VA 22314 703-706-4800 www.nrmca.org/sustainability  Lionel Lemay	NRMCA
LCA and EPD Developer:	**Athena Sustainable Materials Institute** 280 Albert Street, Suite 404 Ottawa, ON K1P 5G8 613-729-9996 www.athenasmi.org  James Salazar	Athena Sustainable Materials Institute
Product Category Rule:	**ISO 21930:2017 Sustainability in Building Construction — Environmental Declaration of Building Products** serves as the core PCR. **NSF International Product Category Rule (PCR) for Concrete Version 1 (February 22, 2019)** serves as the sub-category PCR	
	Sub-category PCR review was conducted by: Thomas P. Gloria, Ph. D. Industrial Ecology Consultants	
Independent LCA Reviewer and EPD Verifier:	Independent verification of the declaration and data, according to ISO 21930:2017 and ISO 14025:2006 ☐ internal ☒external Third party verifier: Cara Vought, LCACP, LEED AP ID+C Sustainable Solutions Corporation	

Description of Company

Ozinga Ready Mix Concrete is a family-owned ready mix concrete supplier founded in 1928. The company currently operates over 800 concrete mixer trucks from 85 plants, most of them in and around Chicago. Other plants are in Florida and Louisiana. Ozinga is a member of the National Ready Mix Concrete Association (NRMCA).

Location of Facilities

Chicago Chinatown Ready Mix Plant
2255 S Lumber Street
Chicago, IL 60616

Chicago Northside Ready Mix Plant
2001 N Mendell Street
Chicago, IL 60614

Evanston Ready Mix Plant
2525 Oakton Avenue
Evanston, IL 60202

Miami 17th Avenue Ready Mix Plant
2165 NW 17th Avenue
Miami, FL 33142

Description of Product and Product System

Products covered by this EPD satisfy general purpose concrete as used in residential, commercial and public works applications in the United States. Product components include (in order of greatest mass per mix): Natural and crushed aggregates, portland cement, slag cement, admixtures, and batch water.

This EPD reports the impacts for 50 different ready-mixed concrete products produced at four different Ozinga Ready Mix Concrete facilities in accordance with the following:

- ACI 211: Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- ACI 318: Building Code Requirements for Structural Concrete
- ASTM C94: Standard Specification for Ready-Mixed Concrete
- CSI MasterFormat Division 03-30-00: Cast-in-Place Concrete
- UNSPSC Code 30111500: Ready Mix

This EPD is intended for use in Business to Business (B-to-B) communication. The scope of this EPD is cradle-to-gate and considers the following life cycle stages.

- **A1 - Raw Material Supply:** Includes all upstream processes related to extraction, handling, and processing of the raw materials and intermediate component products as well as fuels used in the production of concrete. Component products include cement, supplementary cementitious materials, aggregate (coarse and fine), water, admixtures and other materials or chemicals used in concrete mixtures.
- **A2 - Transportation:** Accounts for the transportation of all input materials and fuels from the supplier to the gate of the concrete plant.
- **A3 - Manufacturing (Core Processes):** Includes all core processes and the energy and water used to store, move, batch and mix the concrete and operate the concrete plant as well as the transportation and processing of wastes from these core processes.

Methodology of Underlying LCA

Declared Unit

The declared unit is 1 cubic yard of ready mixed concrete product. Key product variables include:

- Compressive strength – Compressive strengths are represented in the various mix designs and include the number of days after pouring as a part of the reference value: e.g. 3,000 psi (20.7 MPa) @ 28 days; 4,000 psi (27.6 MPa) @ 56 days; 6,000 psi (31.0 MPa) and 90 days; etc.
- Water to cementitious materials ratio (w/cm) – Varies, but generally lower for higher strength non-air entrained mix designs (above 5,000psi (34.5 MPa)) in accordance with ACI 211.1 recommendations.
- SCM use – various mix designs call for portland cement displacement by incorporating fly ash (FA) and/or slag cement (SL);
- Admixtures use – Admixture use was specified for the different mixes that were modeled. These admixtures included an air-entraining admixture, water reducing and accelerating admixtures, and high range water reducer admixtures.
- Carbon dioxide admixture - Ozinga is using CarbonCure® technology in its facilities. Liquid carbon dioxide is added to the mix to increase the strength of the concrete through carbonation. Therefore, less cement has to be added for equivalent strength. While the carbon storage effect of adding CO_2 to the mix is negligible (less than 1% of total CO_2 emissions), GWP decreases due to reduced cement use.

Scope of LCA

A summary of life cycle stages included in the EPD is identified in Figure 1 as follows:

- A1: Raw Material Supply (upstream processes): Extraction, handling and processing of the raw materials used in the production of concrete: cement, supplementary cementitious materials, aggregate (coarse and fine), water, admixtures and other materials or chemicals used in concrete mixtures.
- A2: Transportation: Transportation of these materials from the supplier to the 'gate' of the concrete producer.
- A3: Manufacturing (core processes): The energy used to store, batch, mix and distribute the concrete and operate the facility (concrete plant)

A summary of activities excluded from the EPD is as follows:

- Production, manufacture, and construction of manufacturing capital goods and infrastructure;
- Production and manufacture of production equipment, delivery vehicles, and laboratory equipment;
- Personnel-related activities (travel, furniture, and office supplies); and
- Energy and water use related to company management and sales activities that may be located either within the factory site or at another location.

Building Life Cycle Information Modules (x: Included in LCA; mnd: Module Not Declared)														
Product stage			Construction Process stage		Use stage							End-of-life stage			
Raw Material supply	Transport	Manufacturing	Transport	Construction/Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-Construction/ Demolition	Transport	Waste processing	Disposal
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
x	x	x	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd

Figure 1. Life cycle stage schematic – alpha-numeric designations as per NSF PCR

Cut-off Rules

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically, the cut-off criteria were applied as follows:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute a significant impact or to uncertainty (e.g., portland cement and admixtures) are included.
- The cut-off rules are not applied to hazardous and toxic material flows – all of which are included in the life cycle inventory.
- Proxy data was used for admixtures used by Ozinga that did not align with any of the admixture categories published in the EFCA EPDs. In those cases, the Water Reducing Admixture data was selected as a conservative assumption as per the NSF PCR Appendix A.

Allocation

The allocation of co-products or secondary flows cross the system boundary conforms with ISO 21930: 2017 Section 7.2.4. Specifically, the allocation criteria were applied as follows:

- Allocation was not applied any of the gate-to-gate production facilities. For facilities that manufacture additional products (i.e. aggregate), the LCI flows at the facility specific to the concrete production were reported.
- For secondary data sources, the NSF PCR default allocation selection (i.e. “Cut-off” or “Alloc Rec”) was applied.
- The product category rules for this EPD recognize fly ash, silica fume and slag as recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a concrete material input
- A portion (30%) of the reported fleet energy use for truck mixing plants was allocated to the mixing facility.

Data Sources

This EPD is based on foreground LCI data collected from the participating company’s production facilities for the calendar year 2018. All upstream material, resource and energy carrier inputs have been sourced from various industry-average datasets and literature. Many of these data sets are defaulted to those specified for use in the NSF PCR 2019. Tables 1 to 3 describe each LCI data source and the data quality for each data source.

Table 1. A1 - Raw Material Supply				
Materials	**LCI Data Source**	**Geography**	**Year**	**Data Quality Assessment**
USA Cement ***ASTM C150, C595, C1157***	Portland Cement Association EPD USA Portland Cement[1] (Modeled with complete LCI to support ISO 21930:2017)	USA	2016	• **Technology:** very good • **Time:** very good • **Geography:** very good • **Completeness:** very good • **Reliability:** very good
Slag Cement **ASTM C989**	Slag Cement Association EPD of North America Slag Cement (2015) (Modeled with complete LCI to support ISO 21930:2017)	North America	2015	• **Technology:** very good • **Time:** very good • **Geography:** very good • **Completeness:** very good • **Reliability:** very good
Fly Ash ***ASTM C618***	None, no incoming burden, only inbound transport is considered	N/A	N/A	• **N/A** • **Recovered material**
Crushed Aggregates *coarse and fine* ***ASTM C33***	ecoinvent 3.4: "Gravel, crushed {RoW}| production | Cut-off, U" Modified with region-specific electricity grid.	Global/ Regional	2001	• **Technology:** very good • **Time:** poor • **Geography:** good • **Completeness:** very good • **Reliability:** very good
Natural Aggregates *coarse and fine* ***ASTM C330***	ecoinvent 3.4: "Gravel, round {RoW}| gravel and sand quarry operation | Cut-off, U" Modified with region-specific electricity grid.	Global/ Regional	2001	• **Technology:** very good • **Time:** poor • **Geography:** good • **Completeness:** very good • **Reliability:** very good
Manufactured Lightweight Aggregates	ecoinvent 3.4: Expanded clay {RoW}| production | Cut-off, U Modified with United States average electricity grid	Global/ USA	2000	• **Technology:** good Representative per: http://www.epa.gov/ttnchie1/ap42/ch11/final/c11s20.pdf • **Time:** poor • **Geography:** good • **Completeness:** very good • **Reliability:** very good

1: This EPD was calculated using industry average cement data. Cement LCA impacts can vary depending upon manufacturing process, efficiency and fuel source by as much as 50% for some environmental impact categories. Cement accounts for as much as 97% of the impacts of the concrete mixes included in this EPD and thus manufacturer specific cement impacts could result in variation of as much as 49%.

Table 1. A1 - Raw Material Supply				
Materials	**LCI Data Source**	**Geography**	**Year**	**Data Quality Assessment**
Admixtures ***ASTM C494***	EFCA EPDs for Air Entrainers, Plasticisers and superplasticisers, Hardening Accelerators, Set Accelerators, Water Resisting Admixtures, and Retarders Non-supported LCIA indicators estimated using TRACI equivalents	EU	2015	• **Technology:** very good • **Time:** good • **Geography:** fair • **Completeness:** good • **Reliability:** very good
Batch and Wash Water ***ASTM C1602***	ecoinvent 3.4: Tap water {RoW}| market for | Cut-off, U Modified with US average electricity grid	Global/ USA	2011	• **Technology:** very good • **Time:** good • **Geography:** good • **Completeness:** very good • **Reliability:** very good

Table 2. A2 - Transportation				
Process	**LCI Data Source**	**Geography**	**Year**	**Data Quality Assessment**
Ocean	USLCI 2014: Transport, ocean freighter, average fuel mix /US U (2014)	USA	2007	• **Technology:** very good • **Time:** fair • **Geography:** very good • **Completeness:** very good • **Reliability:** very good
Road	USLCI 2014: Transport, combination truck, short-haul, diesel powered/tkm/RNA Adjusted for Backhauls per NSF PCR 7.1.7.2	USA	2010	• **Technology:** very good • **Time:** good • **Geography:** very good • **Completeness:** very good • **Reliability:** very good

Table 3. A3 - Manufacturing				
Process	**LCI Data Source**	**Geography**	**Year**	**Data Quality Assessment**
Electricity	ecoinvent 3.4: Electricity, low voltage {WECC}| market for | Cut-off, U Electricity grids based on 2014 NERC regions.	USA	2015	• **Technology:** very good • **Time:** very good • **Geography:** very good • **Completeness:** very good **Reliability:** very good
Diesel	USLCI 2014: Diesel, combusted in industrial boiler /US U	USA	2007	• **Technology:** very good • **Time:** fair • **Geography:** very good • **Completeness:** very good **Reliability:** very good
Liquefied Propane Gas	USLCI 2014: Liquefied petroleum gas, combusted in industrial boiler /US U	USA	2007	• **Technology:** very good • **Time:** fair • **Geography:** very good • **Completeness:** very good • **Reliability:** very good
Non-Hazardous Solid Waste,	ecoinvent 3.4: Inert waste {RoW}| treatment of, sanitary landfill | Alloc Rec, U Modified with United States average electricity grid	Global	2011	• **Technology:** very good • **Time:** good • **Geography:** good • **Completeness:** very good • **Reliability:** very good

Life Cycle Assessment Results

This EPD supports 25 life cycle impact assessment indicators and inventory metrics as listed in Table 4. The US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), version 2.1, 2012 impact categories were used to calculate mandatory category indicators.

Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories. Additionally, EPDs are comparable only if they comply with this document, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. No regulated substances of very high concern were identified in the LCA.

Table 4. Life Cycle Category Indicators and Inventory Metrics

Core Mandatory Impact Indicator		
Global warming potential	GWP	kg CO2e
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11e
Acidification potential of soil and water sources	AP	kg SO2e
Eutrophication potential	EP	kg Ne
Photochemical smog creation potential	POCP	kg O3e
Abiotic depletion potential (ADPfossil) for fossil resources	ADPf	MJ, NCV
Fossil fuel depletion	FFD	MJ Surplus
Use of Primary Resources		
Renewable primary energy carrier used as energy	RPRE	MJ, NCV
Renewable primary energy carrier used as material	RPRM	MJ, NCV
Non-renewable primary energy carrier used as energy	NRPRE	MJ, NCV
Non-renewable primary energy carrier used as material	NRPRM	MJ, NCV
Secondary Material, Secondary Fuel and Recovered Energy		
Secondary material	SM	kg
Renewable secondary fuel	RSF	MJ, NCV
Non-renewable secondary fuel	NRSF	MJ, NCV
Recovered energy	RE	MJ, NCV
Mandatory Inventory Parameters		
Consumption of freshwater resources	FW	m3
Calcination and carbonation emissions	CCE	kg CO2e
Indicators Describing Waste		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
High-level radioactive waste, conditioned, to final repository	HLRW	m3
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW	m3
Components for re-use	CRU	kg
Materials for recycling	MR	kg
Materials for energy recovery	MER	kg
Recovered energy exported from the product system	EE	MJ, NCV

Tables 5-8 present the LCA results for the mixes produced at the four facilities. The results are presented first on the basis of a declared unit of 1 cubic yard (Tables 5a, 6a, 7a and 8a) and on the basis of 1 cubic meter (Tables 5b, 6b, 7b and 8b).

Table 5a: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		1097	1097SX	1097SXH	1098S	1098SH	1098SX	1099SH	1099SXH	1145	1145S
Strength	PSI	4000	4000	4000	5000	5000	5000	6000	6000	8750	8750
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	245.80	234.85	236.30	295.99	296.28	277.27	299.40	280.26	361.16	366.46
ODP	kg CFC11e	6.82E-06	7.21E-06	7.21E-06	8.69E-06	8.70E-06	8.24E-06	8.74E-06	8.33E-06	9.62E-06	1.04E-05
AP	kg SO^2e	0.74	0.78	0.78	0.93	0.93	0.88	0.94	0.90	1.03	1.11
EP	kg Ne	0.34	0.33	0.33	0.40	0.40	0.38	0.40	0.38	0.47	0.48
SFP	kg O^3e	15.47	15.41	15.41	18.47	18.52	17.53	18.64	17.83	21.36	22.17
ADPf	MJ, NCV	1411.63	1387.03	1414.39	1701.88	1705.66	1606.12	1761.59	1634.63	2036.66	2099.46
ADPe	kg Sbe	2.60E-04	2.44E-04	2.68E-04	2.85E-04	2.85E-04	2.72E-04	3.32E-04	2.78E-04	3.90E-04	3.86E-04
FFD	MJ Surplus	93.50	95.09	99.20	112.31	112.85	107.16	121.06	110.48	131.49	138.34
Use of Primary Resources											
RPRE	MJ, NCV	81.74	81.17	83.95	98.16	98.36	92.99	104.06	94.77	118.72	122.88
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1528.86	1531.30	1560.60	1866.61	1870.74	1764.65	1931.06	1795.80	2195.11	2290.76
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.28	2.13	2.15	2.71	2.70	2.53	2.73	2.55	3.36	3.36
CCE	kg CO^2e	104.23	96.91	96.91	125.07	125.07	116.42	125.07	117.09	156.34	156.34
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.17E-08	1.14E-08	1.14E-08	1.13E-08	1.13E-08	1.13E-08	1.15E-08	1.16E-08	1.18E-08	1.15E-08
LLRW	m^3	6.85E-04	5.38E-04	1.30E-03	7.54E-04	8.20E-04	7.11E-04	2.23E-03	1.10E-03	1.95E-03	1.95E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		1145SX	1147	1161S	1161SH	1161SXH	1171	1171X	1474SH	1474SXH	1497
Strength	PSI	8750	4000	4000	4000	4000	4000	4000	5000	5000	4000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	347.40	267.00	251.66	254.26	238.61	290.56	271.97	264.90	247.76	288.04
ODP	kg CFC11e	9.99E-06	7.44E-06	7.63E-06	7.63E-06	7.33E-06	7.96E-06	7.52E-06	7.92E-06	7.50E-06	7.94E-06
AP	kg SO^2e	1.06	0.79	0.83	0.83	0.80	0.84	0.80	0.86	0.82	0.83
EP	kg Ne	0.46	0.36	0.35	0.35	0.33	0.39	0.37	0.36	0.34	0.39
SFP	kg O^3e	21.28	16.41	16.41	16.43	15.79	17.47	16.51	16.98	16.10	17.32
ADPf	MJ, NCV	1967.54	1503.94	1481.09	1530.49	1412.12	1640.75	1537.12	1576.10	1481.98	1598.88
ADPe	kg Sbe	3.23E-04	2.75E-04	2.57E-04	3.01E-04	2.66E-04	3.05E-04	2.91E-04	3.10E-04	2.85E-04	2.86E-04
FFD	MJ Surplus	126.86	96.00	101.27	108.67	97.06	105.57	98.81	109.80	103.97	99.32
Use of Primary Resources											
RPRE	MJ, NCV	112.78	88.31	86.25	91.35	83.59	96.47	90.82	94.09	88.16	93.36
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2150.10	1627.88	1631.87	1684.76	1558.19	1773.33	1662.75	1733.25	1633.02	1728.34
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.18	2.50	2.29	2.30	2.17	2.70	2.54	2.41	2.25	2.70
CCE	kg CO^2e	148.58	114.65	104.23	104.23	98.46	125.07	116.87	109.55	101.79	125.07
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.15E-08	1.17E-08	1.16E-08	1.16E-08	1.16E-08	1.15E-08	1.15E-08	1.16E-08	1.16E-08	1.14E-08
LLRW	m^3	7.26E-04	4.17E-04	7.66E-04	2.12E-03	5.12E-04	1.18E-03	8.22E-04	1.73E-03	1.53E-03	6.63E-05
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		1497X	1590S	1598S	1598SX	1606W	1677S	1686S	1686SH	1686SXH	2448S
Strength	PSI	4000	8000	4000	4000	6000	3000	4000	4000	4000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	270.22	341.13	240.94	224.88	345.27	417.51	451.34	453.59	433.73	276.05
ODP	kg CFC11e	7.50E-06	9.66E-06	7.36E-06	6.98E-06	9.30E-06	1.25E-05	1.34E-05	1.35E-05	1.30E-05	8.31E-06
AP	kg SO^2e	0.79	1.03	0.80	0.76	0.98	1.96	2.07	2.07	2.02	0.90
EP	kg Ne	0.37	0.45	0.34	0.32	0.45	0.68	0.72	0.72	0.70	0.38
SFP	kg O^3e	16.37	20.70	15.78	14.98	20.28	28.94	30.86	30.89	29.91	17.60
ADPf	MJ, NCV	1507.35	1941.93	1432.30	1335.72	1938.88	2937.62	3131.39	3174.73	3030.37	1626.94
ADPe	kg Sbe	2.74E-04	3.51E-04	2.62E-04	2.40E-04	3.69E-04	3.34E-04	3.71E-04	4.08E-04	3.44E-04	2.92E-04
FFD	MJ Surplus	94.37	126.47	99.37	92.24	123.89	191.60	204.50	210.98	197.67	111.59
Use of Primary Resources											
RPRE	MJ, NCV	88.41	113.35	84.44	78.56	114.25	196.44	207.64	212.07	201.34	95.33
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1630.82	2115.76	1579.99	1476.91	2091.29	3196.06	3408.25	3454.67	3300.53	1792.82
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.54	3.14	2.19	2.04	3.21	2.58	2.88	2.91	2.74	2.50
CCE	kg CO^2e	116.87	145.92	99.13	92.25	149.69	109.55	124.18	124.18	116.42	114.65
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.15E-08	1.15E-08	1.16E-08	1.16E-08	1.16E-08	3.11E-08	3.11E-08	3.11E-08	3.10E-08	1.14E-08
LLRW	m^3	6.63E-05	1.35E-03	9.82E-04	4.17E-04	1.82E-03	5.07E-04	8.86E-04	2.06E-03	5.44E-04	1.32E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		2448SH	2448SXH	2595S	2595SH	2595SXH	2664S	2664SH	2664SXH	3410S	3410SH
Strength	PSI	5000	5000	5000	5000	5000	4500	4500	4500	5000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	274.90	257.54	253.38	252.88	237.68	251.66	252.03	236.31	243.16	243.15
ODP	kg CFC11e	8.30E-06	7.88E-06	7.79E-06	7.79E-06	7.43E-06	7.74E-06	7.74E-06	7.36E-06	7.69E-06	7.69E-06
AP	kg SO^2e	0.89	0.85	0.84	0.84	0.81	0.83	0.83	0.80	0.84	0.84
EP	kg Ne	0.38	0.36	0.35	0.35	0.33	0.35	0.35	0.33	0.34	0.34
SFP	kg O^3e	17.59	16.69	16.61	16.61	15.89	16.31	16.32	15.57	16.29	16.29
ADPf	MJ, NCV	1604.66	1515.23	1503.60	1495.86	1409.75	1479.44	1485.06	1405.47	1459.94	1459.81
ADPe	kg Sbe	2.71E-04	2.59E-04	2.58E-04	2.58E-04	2.48E-04	2.55E-04	2.56E-04	2.46E-04	2.50E-04	2.50E-04
FFD	MJ Surplus	108.26	103.37	104.10	102.93	97.11	100.63	101.46	97.29	102.59	102.57
Use of Primary Resources											
RPRE	MJ, NCV	92.95	88.13	87.49	87.09	82.47	86.29	86.58	82.29	85.05	85.04
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1768.97	1673.70	1661.74	1653.39	1561.52	1635.46	1641.54	1556.85	1622.30	1622.16
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.49	2.34	2.29	2.29	2.15	2.28	2.30	2.14	2.19	2.18
CCE	kg CO^2e	114.65	106.67	104.23	104.23	97.57	104.23	104.23	96.91	98.90	98.90
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.14E-08	1.14E-08	1.16E-08	1.16E-08	1.16E-08	1.14E-08	1.14E-08	1.15E-08	1.16E-08	1.16E-08
LLRW	m^3	7.19E-04	6.78E-04	9.52E-04	7.12E-04	3.01E-04	4.98E-04	6.56E-04	6.22E-04	7.96E-04	7.93E-04
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		3410SXH	3411S	3411SH	3411SXH	4246SX	4248SX	4321SX	4331SX	4332SX	4591X
Strength	PSI	5000	6000	6000	6000	8000	6000	12000	5000	5000	10000
	@ days	28	28	28	28	56	56	56	28	28	56
Core Mandatory Impact Indicators											
GWP	kg CO^2e	227.98	276.38	275.98	262.25	260.35	230.87	296.23	261.69	262.96	237.23
ODP	kg CFC11e	7.35E-06	8.60E-06	8.59E-06	8.26E-06	8.21E-06	7.35E-06	9.31E-06	7.82E-06	7.87E-06	7.52E-06
AP	kg SO^2e	0.80	0.94	0.94	0.90	0.90	0.81	1.03	0.84	0.85	0.83
EP	kg Ne	0.32	0.38	0.38	0.36	0.36	0.33	0.41	0.36	0.36	0.33
SFP	kg O^3e	15.58	18.10	18.07	17.36	17.30	15.60	19.45	16.70	16.95	16.02
ADPf	MJ, NCV	1369.01	1656.24	1655.10	1578.64	1576.47	1424.33	1849.65	1527.72	1544.96	1478.83
ADPe	kg Sbe	2.41E-04	2.92E-04	3.13E-04	2.89E-04	3.01E-04	2.89E-04	3.62E-04	2.75E-04	2.77E-04	3.08E-04
FFD	MJ Surplus	95.78	116.39	116.24	111.40	112.21	104.10	138.45	103.09	105.52	109.92
Use of Primary Resources											
RPRE	MJ, NCV	80.24	96.78	98.01	92.96	93.69	85.91	110.29	89.53	90.46	89.64
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1525.25	1837.17	1835.69	1754.29	1752.09	1584.41	2059.92	1679.66	1698.53	1644.31
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.05	2.48	2.48	2.35	2.33	2.06	2.58	2.38	2.39	2.09
CCE	kg CO^2e	92.47	113.10	113.10	106.89	105.78	92.47	118.20	109.33	109.33	94.47
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.17E-08	1.15E-08	1.15E-08	1.15E-08	1.16E-08	1.16E-08	1.16E-08	1.14E-08	1.16E-08	1.17E-08
LLRW	m^3	1.51E-04	1.45E-03	1.36E-03	1.18E-03	1.38E-03	1.69E-03	3.91E-03	7.70E-04	1.05E-03	2.37E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5b: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		1097	1097SX	1097SXH	1098S	1098SH	1098SX	1099SH	1099SXH	1145	1145S
Strength	PSI	4000	4000	4000	5000	5000	5000	6000	6000	8750	8750
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	321.08	306.77	308.67	386.63	387.01	362.19	391.09	366.09	471.77	478.69
ODP	kg CFC11e	8.91E-06	9.41E-06	9.41E-06	1.14E-05	1.14E-05	1.08E-05	1.14E-05	1.09E-05	1.26E-05	1.36E-05
AP	kg SO^2e	0.97	1.02	1.02	1.21	1.22	1.15	1.23	1.17	1.35	1.45
EP	kg Ne	0.44	0.43	0.43	0.52	0.52	0.49	0.53	0.50	0.61	0.63
SFP	kg O^3e	20.21	20.12	20.13	24.13	24.19	22.91	24.36	23.29	27.90	28.96
ADPf	MJ, NCV	1843.94	1811.82	1847.55	2223.08	2228.02	2098.00	2301.08	2135.24	2660.40	2742.42
ADPe	kg Sbe	3.39E-04	3.19E-04	3.50E-04	3.72E-04	3.73E-04	3.56E-04	4.33E-04	3.63E-04	5.10E-04	5.04E-04
FFD	MJ Surplus	122.14	124.22	129.57	146.71	147.41	139.98	158.13	144.32	171.76	180.71
Use of Primary Resources											
RPRE	MJ, NCV	106.77	106.03	109.66	128.22	128.48	121.47	135.92	123.79	155.08	160.52
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1997.08	2000.27	2038.54	2438.26	2443.66	2305.07	2522.44	2345.77	2867.37	2992.31
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.98	2.79	2.80	3.54	3.53	3.30	3.56	3.33	4.39	4.39
CCE	kg CO^2e	136.15	126.59	126.59	163.37	163.37	152.08	163.37	152.95	204.22	204.22
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.53E-08	1.49E-08	1.49E-08	1.48E-08	1.48E-08	1.48E-08	1.51E-08	1.52E-08	1.54E-08	1.50E-08
LLRW	m^3	8.94E-04	7.03E-04	1.70E-03	9.84E-04	1.07E-03	9.28E-04	2.91E-03	1.43E-03	2.54E-03	2.54E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		1145SX	1147	1161S	1161SH	1161SXH	1171	1171X	1474SH	1474SXH	1497
Strength	PSI	8750	4000	4000	4000	4000	4000	4000	5000	5000	4000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	453.79	348.77	328.74	332.13	311.69	379.55	355.26	346.02	323.64	376.26
ODP	kg CFC11e	1.30E-05	9.72E-06	9.97E-06	9.97E-06	9.57E-06	1.04E-05	9.82E-06	1.03E-05	9.80E-06	1.04E-05
AP	kg SO^2e	1.39	1.03	1.08	1.09	1.04	1.10	1.04	1.12	1.07	1.09
EP	kg Ne	0.60	0.47	0.46	0.46	0.44	0.51	0.48	0.48	0.45	0.50
SFP	kg O^3e	27.79	21.43	21.43	21.46	20.62	22.81	21.56	22.18	21.03	22.63
ADPf	MJ, NCV	2570.11	1964.53	1934.68	1999.21	1844.59	2143.23	2007.87	2058.78	1935.84	2088.54
ADPe	kg Sbe	4.21E-04	3.59E-04	3.36E-04	3.93E-04	3.47E-04	3.99E-04	3.81E-04	4.05E-04	3.72E-04	3.74E-04
FFD	MJ Surplus	165.71	125.40	132.28	141.95	126.79	137.91	129.07	143.43	135.81	129.74
Use of Primary Resources											
RPRE	MJ, NCV	147.31	115.36	112.66	119.33	109.18	126.02	118.63	122.91	115.16	121.95
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2808.57	2126.43	2131.63	2200.73	2035.39	2316.42	2171.97	2264.06	2133.14	2257.65
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	4.16	3.26	2.99	3.01	2.84	3.53	3.31	3.14	2.94	3.52
CCE	kg CO^2e	194.08	149.76	136.15	136.15	128.61	163.37	152.66	143.10	132.96	163.37
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.50E-08	1.53E-08	1.51E-08	1.51E-08	1.51E-08	1.50E-08	1.50E-08	1.51E-08	1.52E-08	1.50E-08
LLRW	m^3	9.48E-04	5.44E-04	1.00E-03	2.77E-03	6.68E-04	1.54E-03	1.07E-03	2.26E-03	2.00E-03	8.66E-05
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		1497X	1590S	1598S	1598SX	1606W	1677S	1686S	1686SH	1686SXH	2448S
Strength	PSI	4000	8000	4000	4000	6000	3000	4000	4000	4000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	352.97	445.60	314.73	293.75	451.01	545.38	589.56	592.51	566.56	360.60
ODP	kg CFC11e	9.80E-06	1.26E-05	9.61E-06	9.12E-06	1.21E-05	1.63E-05	1.76E-05	1.76E-05	1.70E-05	1.09E-05
AP	kg SO^2e	1.03	1.35	1.04	0.99	1.28	2.57	2.70	2.71	2.64	1.17
EP	kg Ne	0.48	0.59	0.44	0.41	0.59	0.88	0.94	0.94	0.91	0.49
SFP	kg O^3e	21.39	27.04	20.62	19.57	26.49	37.80	40.32	40.35	39.07	22.99
ADPf	MJ, NCV	1968.99	2536.66	1870.95	1744.78	2532.66	3837.27	4090.38	4146.99	3958.43	2125.20
ADPe	kg Sbe	3.58E-04	4.58E-04	3.42E-04	3.13E-04	4.82E-04	4.37E-04	4.84E-04	5.33E-04	4.49E-04	3.81E-04
FFD	MJ Surplus	123.27	165.21	129.80	120.49	161.83	250.28	267.13	275.59	258.21	145.77
Use of Primary Resources											
RPRE	MJ, NCV	115.49	148.06	110.30	102.62	149.24	256.60	271.23	277.02	263.00	124.52
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2130.26	2763.72	2063.87	1929.22	2731.75	4174.85	4452.04	4512.67	4311.32	2341.88
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.31	4.10	2.86	2.67	4.20	3.37	3.77	3.80	3.58	3.26
CCE	kg CO^2e	152.66	190.60	129.48	120.50	195.53	143.10	162.22	162.22	152.08	149.76
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.50E-08	1.51E-08	1.52E-08	1.52E-08	1.51E-08	4.06E-08	4.06E-08	4.06E-08	4.06E-08	1.49E-08
LLRW	m^3	8.66E-05	1.76E-03	1.28E-03	5.44E-04	2.37E-03	6.62E-04	1.16E-03	2.69E-03	7.11E-04	1.72E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		2448SH	2448SXH	2595S	2595SH	2595SXH	2664S	2664SH	2664SXH	3410S	3410SH
Strength	PSI	5000	5000	5000	5000	5000	4500	4500	4500	5000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	359.08	336.41	330.98	330.33	310.47	328.73	329.22	308.68	317.63	317.62
ODP	kg CFC11e	1.08E-05	1.03E-05	1.02E-05	1.02E-05	9.71E-06	1.01E-05	1.01E-05	9.62E-06	1.00E-05	1.00E-05
AP	kg SO^2e	1.17	1.11	1.10	1.10	1.05	1.09	1.09	1.04	1.09	1.09
EP	kg Ne	0.49	0.46	0.46	0.46	0.44	0.46	0.46	0.43	0.45	0.45
SFP	kg O^3e	22.97	21.80	21.70	21.70	20.75	21.30	21.32	20.34	21.27	21.27
ADPf	MJ, NCV	2096.10	1979.27	1964.09	1953.96	1841.49	1932.53	1939.86	1835.90	1907.05	1906.88
ADPe	kg Sbe	3.54E-04	3.39E-04	3.37E-04	3.37E-04	3.24E-04	3.34E-04	3.34E-04	3.21E-04	3.27E-04	3.27E-04
FFD	MJ Surplus	141.42	135.02	135.98	134.46	126.85	131.45	132.54	127.09	134.01	133.99
Use of Primary Resources											
RPRE	MJ, NCV	121.42	115.11	114.28	113.76	107.73	112.71	113.10	107.49	111.10	111.09
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2310.72	2186.28	2170.66	2159.74	2039.74	2136.32	2144.27	2033.64	2119.14	2118.95
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.25	3.06	3.00	3.00	2.81	2.98	3.00	2.80	2.86	2.85
CCE	kg CO^2e	149.76	139.33	136.15	136.15	127.46	136.15	136.15	126.59	129.19	129.19
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.49E-08	1.49E-08	1.52E-08	1.52E-08	1.52E-08	1.49E-08	1.49E-08	1.50E-08	1.52E-08	1.52E-08
LLRW	m^3	9.39E-04	8.86E-04	1.24E-03	9.31E-04	3.93E-04	6.50E-04	8.57E-04	8.12E-04	1.04E-03	1.04E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Chinatown

Mix ID		3410SXH	3411S	3411SH	3411SXH	4246SX	4248SX	4321SX	4331SX	4332SX	4591X
Strength	PSI	5000	6000	6000	6000	8000	6000	12000	5000	5000	10000
	@ days	28	28	28	28	56	56	56	28	28	56
Core Mandatory Impact Indicators											
GWP	kg CO^2e	297.80	361.02	360.50	342.57	340.08	301.57	386.94	341.83	343.49	309.88
ODP	kg CFC11e	9.61E-06	1.12E-05	1.12E-05	1.08E-05	1.07E-05	9.60E-06	1.22E-05	1.02E-05	1.03E-05	9.82E-06
AP	kg SO^2e	1.05	1.22	1.22	1.18	1.17	1.06	1.35	1.10	1.11	1.09
EP	kg Ne	0.42	0.50	0.50	0.48	0.47	0.43	0.53	0.47	0.47	0.44
SFP	kg O^3e	20.35	23.64	23.61	22.68	22.59	20.38	25.41	21.82	22.14	20.92
ADPf	MJ, NCV	1788.28	2163.47	2161.98	2062.11	2059.27	1860.53	2416.11	1995.58	2018.11	1931.72
ADPe	kg Sbe	3.14E-04	3.82E-04	4.09E-04	3.77E-04	3.94E-04	3.78E-04	4.72E-04	3.59E-04	3.62E-04	4.02E-04
FFD	MJ Surplus	125.12	152.04	151.84	145.52	146.57	135.98	180.86	134.67	137.83	143.58
Use of Primary Resources											
RPRE	MJ, NCV	104.81	126.42	128.03	121.42	122.38	112.23	144.07	116.94	118.16	117.09
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1992.36	2399.80	2397.88	2291.55	2288.67	2069.64	2690.78	2194.06	2218.71	2147.88
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.68	3.24	3.24	3.07	3.04	2.69	3.37	3.11	3.12	2.73
CCE	kg CO^2e	120.79	147.73	147.73	139.62	138.17	120.79	154.39	142.81	142.81	123.40
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.52E-08	1.51E-08	1.51E-08	1.51E-08	1.52E-08	1.52E-08	1.51E-08	1.49E-08	1.51E-08	1.53E-08
LLRW	m^3	1.97E-04	1.89E-03	1.78E-03	1.55E-03	1.80E-03	2.20E-03	5.11E-03	1.01E-03	1.38E-03	3.10E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6a: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		1097	1097SX	1097SXH	1098S	1098SH	1098SX	1099SH	1099SXH	1145	1145S
Strength	PSI	4000	4000	4000	5000	5000	5000	6000	6000	8750	8750
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	252.16	242.43	243.88	303.57	303.85	284.85	307.13	287.99	367.68	374.19
ODP	kg CFC11e	6.90E-06	7.28E-06	7.28E-06	8.77E-06	8.78E-06	8.31E-06	8.81E-06	8.40E-06	9.70E-06	1.05E-05
AP	kg SO^2e	0.79	0.84	0.85	1.00	1.00	0.95	1.01	0.96	1.09	1.18
EP	kg Ne	0.35	0.34	0.34	0.41	0.41	0.39	0.42	0.40	0.48	0.50
SFP	kg O^3e	16.55	16.85	16.85	19.91	19.96	18.98	20.12	19.30	22.48	23.64
ADPf	MJ, NCV	1499.88	1492.74	1520.10	1807.62	1811.34	1711.85	1869.60	1742.57	2127.19	2207.37
ADPe	kg Sbe	2.61E-04	2.45E-04	2.68E-04	2.86E-04	2.86E-04	2.73E-04	3.33E-04	2.79E-04	3.91E-04	3.87E-04
FFD	MJ Surplus	105.60	109.77	113.87	126.99	127.52	121.84	136.08	125.49	143.92	153.34
Use of Primary Resources											
RPRE	MJ, NCV	82.01	81.44	84.22	98.43	98.63	93.26	104.33	95.04	118.99	123.15
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1628.47	1649.42	1678.73	1984.77	1988.83	1882.79	2051.63	1916.28	2297.14	2411.21
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.29	2.14	2.15	2.72	2.71	2.54	2.73	2.56	3.36	3.36
CCE	kg CO^2e	104.23	96.91	96.91	125.07	125.07	116.42	125.07	117.09	156.34	156.34
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.46E-08	1.43E-08	1.43E-08	1.42E-08	1.42E-08	1.42E-08	1.44E-08	1.45E-08	1.46E-08	1.44E-08
LLRW	m^3	6.85E-04	5.39E-04	1.30E-03	7.54E-04	8.20E-04	7.11E-04	2.23E-03	1.10E-03	1.95E-03	1.95E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		1145SX	1147	1161S	1161SH	1161SXH	1171	1171X	1474SH	1474SXH	1497
Strength	PSI	8750	4000	4000	4000	4000	4000	4000	5000	5000	4000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	355.13	274.55	259.22	261.82	246.17	297.95	279.36	272.56	255.43	295.55
ODP	kg CFC11e	1.01E-05	7.52E-06	7.71E-06	7.71E-06	7.40E-06	8.04E-06	7.59E-06	7.99E-06	7.58E-06	8.02E-06
AP	kg SO^2e	1.13	0.85	0.89	0.90	0.86	0.91	0.86	0.93	0.88	0.90
EP	kg Ne	0.47	0.38	0.36	0.36	0.35	0.40	0.38	0.38	0.36	0.40
SFP	kg O^3e	22.75	17.83	17.84	17.86	17.22	18.85	17.89	18.44	17.56	18.74
ADPf	MJ, NCV	2075.49	1609.35	1586.57	1635.95	1517.58	1743.80	1640.23	1683.08	1589.00	1703.57
ADPe	kg Sbe	3.23E-04	2.75E-04	2.58E-04	3.01E-04	2.66E-04	3.06E-04	2.92E-04	3.11E-04	2.85E-04	2.87E-04
FFD	MJ Surplus	141.86	110.63	115.91	123.31	111.70	119.86	113.10	124.66	118.84	113.85
Use of Primary Resources											
RPRE	MJ, NCV	113.05	88.59	86.52	91.63	83.86	96.74	91.09	94.37	88.43	93.63
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2270.59	1745.69	1749.74	1802.62	1676.04	1888.63	1778.12	1852.72	1752.53	1845.39
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.19	2.50	2.30	2.31	2.18	2.71	2.54	2.41	2.25	2.70
CCE	kg CO^2e	148.58	114.65	104.23	104.23	98.46	125.07	116.87	109.55	101.79	125.07
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.44E-08	1.46E-08	1.44E-08	1.44E-08	1.45E-08	1.44E-08	1.44E-08	1.45E-08	1.45E-08	1.43E-08
LLRW	m^3	7.26E-04	4.17E-04	7.66E-04	2.12E-03	5.12E-04	1.18E-03	8.22E-04	1.73E-03	1.53E-03	6.63E-05
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		1497X	1590S	1598S	1598SX	1606W	1677S	1686S	1686SH	1686SXH	2448S
Strength	PSI	4000	8000	4000	4000	6000	3000	4000	4000	4000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	277.72	348.81	248.61	232.55	352.80	420.12	453.97	456.22	436.37	283.77
ODP	kg CFC11e	7.58E-06	9.74E-06	7.43E-06	7.06E-06	9.37E-06	1.26E-05	1.35E-05	1.36E-05	1.31E-05	8.38E-06
AP	kg SO^2e	0.85	1.10	0.86	0.82	1.05	1.98	2.08	2.09	2.03	0.96
EP	kg Ne	0.38	0.47	0.35	0.33	0.47	0.68	0.72	0.72	0.70	0.39
SFP	kg O^3e	17.79	22.16	17.24	16.44	21.69	29.16	31.09	31.12	30.15	19.08
ADPf	MJ, NCV	1612.11	2049.24	1539.34	1442.81	2044.02	2973.98	3168.15	3211.46	3067.25	1734.62
ADPe	kg Sbe	2.75E-04	3.51E-04	2.63E-04	2.40E-04	3.70E-04	3.35E-04	3.71E-04	4.09E-04	3.45E-04	2.93E-04
FFD	MJ Surplus	108.90	141.39	114.24	107.12	138.48	196.71	209.67	216.14	202.86	126.56
Use of Primary Resources											
RPRE	MJ, NCV	88.68	113.62	84.71	78.83	114.52	196.59	207.79	212.22	201.48	95.60
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1747.92	2235.58	1699.52	1596.50	2208.82	3237.76	3450.38	3496.77	3342.78	1913.04
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.54	3.15	2.20	2.05	3.22	2.58	2.89	2.92	2.74	2.50
CCE	kg CO^2e	116.87	145.92	99.13	92.25	149.69	109.55	124.18	124.18	116.42	114.65
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.43E-08	1.44E-08	1.45E-08	1.45E-08	1.45E-08	3.24E-08	3.24E-08	3.24E-08	3.23E-08	1.43E-08
LLRW	m^3	6.63E-05	1.35E-03	9.82E-04	4.17E-04	1.82E-03	5.07E-04	8.86E-04	2.06E-03	5.44E-04	1.32E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		2448SH	2448SXH	2595S	2595SH	2595SXH	2664S	2664SH	2664SXH	3410S	3410SH
Strength	PSI	5000	5000	5000	5000	5000	4500	4500	4500	5000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	282.61	265.26	261.08	260.58	245.38	259.45	259.82	244.10	250.94	250.93
ODP	kg CFC11e	8.38E-06	7.96E-06	7.86E-06	7.86E-06	7.51E-06	7.81E-06	7.82E-06	7.44E-06	7.77E-06	7.77E-06
AP	kg SO^2e	0.96	0.92	0.91	0.91	0.87	0.90	0.90	0.86	0.91	0.91
EP	kg Ne	0.39	0.37	0.37	0.36	0.35	0.36	0.36	0.34	0.35	0.35
SFP	kg O^3e	19.07	18.17	18.08	18.08	17.36	17.81	17.83	17.07	17.78	17.78
ADPf	MJ, NCV	1712.36	1622.95	1611.10	1603.35	1517.24	1588.29	1593.89	1514.23	1568.60	1568.47
ADPe	kg Sbe	2.72E-04	2.60E-04	2.59E-04	2.59E-04	2.49E-04	2.56E-04	2.57E-04	2.46E-04	2.51E-04	2.51E-04
FFD	MJ Surplus	123.23	118.34	119.04	117.87	112.05	115.77	116.60	112.42	117.70	117.69
Use of Primary Resources											
RPRE	MJ, NCV	93.22	88.40	87.76	87.36	82.74	86.56	86.85	82.56	85.32	85.31
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1889.20	1793.96	1781.76	1773.40	1681.52	1756.90	1762.97	1678.21	1743.55	1743.40
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.49	2.35	2.30	2.30	2.16	2.29	2.30	2.15	2.19	2.19
CCE	kg CO^2e	114.65	106.67	104.23	104.23	97.57	104.23	104.23	96.91	98.90	98.90
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.43E-08	1.43E-08	1.45E-08	1.45E-08	1.45E-08	1.43E-08	1.43E-08	1.44E-08	1.45E-08	1.45E-08
LLRW	m^3	7.19E-04	6.78E-04	9.52E-04	7.12E-04	3.01E-04	4.98E-04	6.56E-04	6.22E-04	7.96E-04	7.93E-04
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		3410SXH	3411S	3411SH	3411SXH	4246SX	4248SX	4321SX	4331SX	4332SX	4591X
Strength	PSI	5000	6000	6000	6000	8000	6000	12000	5000	5000	10000
	@ days	28	28	28	28	56	56	56	28	28	56
Core Mandatory Impact Indicators											
GWP	kg CO^2e	235.79	284.19	283.80	270.07	268.19	238.65	304.16	269.26	270.50	245.04
ODP	kg CFC11e	7.43E-06	8.67E-06	8.67E-06	8.34E-06	8.29E-06	7.43E-06	9.39E-06	7.90E-06	7.94E-06	7.60E-06
AP	kg SO^2e	0.87	1.01	1.01	0.97	0.97	0.88	1.10	0.91	0.92	0.90
EP	kg Ne	0.34	0.39	0.39	0.38	0.38	0.34	0.42	0.37	0.37	0.35
SFP	kg O^3e	17.09	19.60	19.58	18.87	18.81	17.09	20.99	18.14	18.38	17.51
ADPf	MJ, NCV	1478.16	1765.38	1764.27	1687.84	1686.11	1532.97	1960.53	1633.31	1650.26	1587.93
ADPe	kg Sbe	2.41E-04	2.93E-04	3.14E-04	2.89E-04	3.02E-04	2.90E-04	3.62E-04	2.76E-04	2.78E-04	3.08E-04
FFD	MJ Surplus	110.97	131.57	131.43	126.60	127.46	119.21	153.90	117.75	120.13	125.10
Use of Primary Resources											
RPRE	MJ, NCV	80.51	97.05	98.28	93.23	93.96	86.18	110.56	89.80	90.73	89.91
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1647.01	1958.92	1957.48	1876.11	1874.37	1705.64	2183.53	1797.66	1816.22	1766.02
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.06	2.48	2.48	2.36	2.34	2.06	2.59	2.39	2.39	2.10
CCE	kg CO^2e	92.47	113.10	113.10	106.89	105.78	92.47	118.20	109.33	109.33	94.47
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.45E-08	1.44E-08	1.44E-08	1.44E-08	1.45E-08	1.45E-08	1.45E-08	1.43E-08	1.44E-08	1.46E-08
LLRW	m^3	1.51E-04	1.45E-03	1.36E-03	1.18E-03	1.38E-03	1.69E-03	3.91E-03	7.70E-04	1.05E-03	2.37E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6b: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		1097	1097SX	1097SXH	1098S	1098SH	1098SX	1099SH	1099SXH	1145	1145S
Strength	PSI	4000	4000	4000	5000	5000	5000	6000	6000	8750	8750
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	329.39	316.67	318.57	396.53	396.91	372.09	401.19	376.19	480.28	488.78
ODP	kg CFC11e	9.01E-06	9.51E-06	9.52E-06	1.15E-05	1.15E-05	1.09E-05	1.15E-05	1.10E-05	1.27E-05	1.37E-05
AP	kg SO^2e	1.04	1.10	1.11	1.30	1.30	1.24	1.32	1.26	1.42	1.54
EP	kg Ne	0.45	0.45	0.45	0.54	0.54	0.51	0.55	0.52	0.63	0.65
SFP	kg O^3e	21.62	22.01	22.02	26.01	26.08	24.79	26.29	25.22	29.36	30.88
ADPf	MJ, NCV	1959.22	1949.90	1985.64	2361.20	2366.06	2236.11	2442.18	2276.24	2778.65	2883.38
ADPe	kg Sbe	3.40E-04	3.20E-04	3.51E-04	3.73E-04	3.74E-04	3.57E-04	4.34E-04	3.64E-04	5.11E-04	5.05E-04
FFD	MJ Surplus	137.94	143.39	148.75	165.89	166.58	159.16	177.75	163.92	188.00	200.31
Use of Primary Resources											
RPRE	MJ, NCV	107.12	106.38	110.01	128.57	128.83	121.82	136.28	124.15	155.43	160.87
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2127.19	2154.56	2192.84	2592.60	2597.92	2459.39	2679.94	2503.15	3000.65	3149.65
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.99	2.79	2.81	3.55	3.54	3.31	3.57	3.34	4.40	4.39
CCE	kg CO^2e	136.15	126.59	126.59	163.37	163.37	152.08	163.37	152.95	204.22	204.22
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.91E-08	1.87E-08	1.87E-08	1.85E-08	1.86E-08	1.86E-08	1.89E-08	1.90E-08	1.91E-08	1.88E-08
LLRW	m^3	8.94E-04	7.03E-04	1.70E-03	9.84E-04	1.07E-03	9.28E-04	2.91E-03	1.43E-03	2.54E-03	2.54E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		1145SX	1147	1161S	1161SH	1161SXH	1171	1171X	1474SH	1474SXH	1497
Strength	PSI	8750	4000	4000	4000	4000	4000	4000	5000	5000	4000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	463.89	358.63	338.61	342.00	321.56	389.20	364.92	356.03	333.65	386.06
ODP	kg CFC11e	1.32E-05	9.82E-06	1.01E-05	1.01E-05	9.67E-06	1.05E-05	9.92E-06	1.04E-05	9.90E-06	1.05E-05
AP	kg SO^2e	1.48	1.11	1.16	1.17	1.12	1.18	1.12	1.21	1.15	1.17
EP	kg Ne	0.62	0.49	0.47	0.48	0.45	0.53	0.50	0.49	0.47	0.52
SFP	kg O^3e	29.72	23.29	23.30	23.33	22.49	24.62	23.37	24.08	22.94	24.47
ADPf	MJ, NCV	2711.11	2102.22	2072.45	2136.96	1982.34	2277.84	2142.56	2198.53	2075.63	2225.30
ADPe	kg Sbe	4.22E-04	3.60E-04	3.37E-04	3.94E-04	3.48E-04	4.00E-04	3.82E-04	4.06E-04	3.73E-04	3.75E-04
FFD	MJ Surplus	185.31	144.51	151.41	161.07	145.91	156.56	147.74	162.84	155.24	148.71
Use of Primary Resources											
RPRE	MJ, NCV	147.67	115.71	113.02	119.69	109.54	126.37	118.99	123.26	115.51	122.30
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2965.97	2280.31	2285.60	2354.67	2189.34	2467.03	2322.67	2420.12	2289.24	2410.54
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	4.16	3.27	3.00	3.02	2.84	3.54	3.32	3.15	2.94	3.53
CCE	kg CO^2e	194.08	149.76	136.15	136.15	128.61	163.37	152.66	143.10	132.96	163.37
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.88E-08	1.91E-08	1.89E-08	1.89E-08	1.89E-08	1.88E-08	1.87E-08	1.89E-08	1.89E-08	1.87E-08
LLRW	m^3	9.48E-04	5.44E-04	1.00E-03	2.77E-03	6.68E-04	1.54E-03	1.07E-03	2.26E-03	2.00E-03	8.66E-05
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		1497X	1590S	1598S	1598SX	1606W	1677S	1686S	1686SH	1686SXH	2448S
Strength	PSI	4000	8000	4000	4000	6000	3000	4000	4000	4000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	362.78	455.64	324.75	303.77	460.85	548.78	592.99	595.94	570.01	370.67
ODP	kg CFC11e	9.90E-06	1.27E-05	9.71E-06	9.22E-06	1.22E-05	1.65E-05	1.77E-05	1.77E-05	1.71E-05	1.10E-05
AP	kg SO^2e	1.11	1.43	1.13	1.08	1.37	2.58	2.72	2.73	2.66	1.26
EP	kg Ne	0.49	0.61	0.46	0.43	0.61	0.89	0.94	0.94	0.91	0.51
SFP	kg O^3e	23.24	28.95	22.53	21.48	28.33	38.09	40.61	40.65	39.38	24.93
ADPf	MJ, NCV	2105.82	2676.83	2010.77	1884.67	2670.01	3884.77	4138.40	4194.98	4006.60	2265.85
ADPe	kg Sbe	3.59E-04	4.59E-04	3.43E-04	3.14E-04	4.83E-04	4.38E-04	4.85E-04	5.34E-04	4.50E-04	3.82E-04
FFD	MJ Surplus	142.25	184.69	149.23	139.93	180.89	256.95	273.88	282.34	264.99	165.32
Use of Primary Resources											
RPRE	MJ, NCV	115.84	148.42	110.65	102.97	149.59	256.79	271.42	277.21	263.19	124.88
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2283.23	2920.24	2220.00	2085.43	2885.27	4229.33	4507.07	4567.67	4366.51	2498.91
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.32	4.11	2.87	2.68	4.21	3.38	3.77	3.81	3.59	3.27
CCE	kg CO^2e	152.66	190.60	129.48	120.50	195.53	143.10	162.22	162.22	152.08	149.76
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.87E-08	1.88E-08	1.89E-08	1.89E-08	1.89E-08	4.23E-08	4.23E-08	4.23E-08	4.22E-08	1.87E-08
LLRW	m^3	8.66E-05	1.76E-03	1.28E-03	5.44E-04	2.37E-03	6.62E-04	1.16E-03	2.69E-03	7.11E-04	1.72E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		2448SH	2448SXH	2595S	2595SH	2595SXH	2664S	2664SH	2664SXH	3410S	3410SH
Strength	PSI	5000	5000	5000	5000	5000	4500	4500	4500	5000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	369.16	346.49	341.04	340.39	320.53	338.91	339.40	318.85	327.80	327.78
ODP	kg CFC11e	1.09E-05	1.04E-05	1.03E-05	1.03E-05	9.81E-06	1.02E-05	1.02E-05	9.72E-06	1.01E-05	1.01E-05
AP	kg SO^2e	1.26	1.20	1.19	1.19	1.14	1.18	1.18	1.13	1.18	1.18
EP	kg Ne	0.51	0.48	0.48	0.48	0.45	0.47	0.47	0.45	0.46	0.46
SFP	kg O^3e	24.90	23.73	23.62	23.62	22.67	23.27	23.28	22.30	23.22	23.22
ADPf	MJ, NCV	2236.77	2119.98	2104.50	2094.38	1981.89	2074.70	2082.02	1977.97	2048.98	2048.81
ADPe	kg Sbe	3.55E-04	3.40E-04	3.38E-04	3.38E-04	3.25E-04	3.35E-04	3.35E-04	3.22E-04	3.28E-04	3.28E-04
FFD	MJ Surplus	160.97	154.58	155.49	153.97	146.36	151.23	152.31	146.85	153.75	153.73
Use of Primary Resources											
RPRE	MJ, NCV	121.77	115.47	114.64	114.12	108.08	113.07	113.45	107.85	111.45	111.44
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2467.77	2343.36	2327.42	2316.50	2196.49	2294.96	2302.89	2192.17	2277.51	2277.32
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.26	3.07	3.00	3.00	2.82	2.99	3.01	2.81	2.87	2.86
CCE	kg CO^2e	149.76	139.33	136.15	136.15	127.46	136.15	136.15	126.59	129.19	129.19
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.87E-08	1.87E-08	1.89E-08	1.89E-08	1.90E-08	1.87E-08	1.87E-08	1.88E-08	1.89E-08	1.89E-08
LLRW	m^3	9.39E-04	8.86E-04	1.24E-03	9.31E-04	3.93E-04	6.50E-04	8.58E-04	8.12E-04	1.04E-03	1.04E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Chicago Northside

Mix ID		3410SXH	3411S	3411SH	3411SXH	4246SX	4248SX	4321SX	4331SX	4332SX	4591X
Strength	PSI	5000	6000	6000	6000	8000	6000	12000	5000	5000	10000
	@ days	28	28	28	28	56	56	56	28	28	56
Core Mandatory Impact Indicators											
GWP	kg CO^2e	308.00	371.22	370.71	352.78	350.33	311.73	397.31	351.72	353.35	320.08
ODP	kg CFC11e	9.71E-06	1.13E-05	1.13E-05	1.09E-05	1.08E-05	9.70E-06	1.23E-05	1.03E-05	1.04E-05	9.92E-06
AP	kg SO^2e	1.14	1.31	1.31	1.27	1.26	1.15	1.44	1.19	1.20	1.18
EP	kg Ne	0.44	0.51	0.51	0.49	0.49	0.44	0.55	0.49	0.49	0.45
SFP	kg O^3e	22.32	25.60	25.57	24.65	24.57	22.33	27.42	23.70	24.00	22.88
ADPf	MJ, NCV	1930.84	2306.03	2304.59	2204.75	2202.48	2002.44	2560.95	2133.51	2155.66	2074.23
ADPe	kg Sbe	3.15E-04	3.83E-04	4.10E-04	3.78E-04	3.95E-04	3.79E-04	4.73E-04	3.60E-04	3.63E-04	4.03E-04
FFD	MJ Surplus	144.95	171.87	171.68	165.37	166.50	155.72	201.03	153.82	156.93	163.41
Use of Primary Resources											
RPRE	MJ, NCV	105.17	126.77	128.38	121.78	122.74	112.58	144.42	117.30	118.51	117.45
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2151.41	2558.85	2556.97	2450.68	2448.40	2227.99	2852.24	2348.20	2372.44	2306.87
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.69	3.25	3.24	3.08	3.05	2.69	3.38	3.12	3.12	2.74
CCE	kg CO^2e	120.79	147.73	147.73	139.62	138.17	120.79	154.39	142.81	142.81	123.40
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.90E-08	1.88E-08	1.88E-08	1.88E-08	1.89E-08	1.90E-08	1.89E-08	1.86E-08	1.89E-08	1.91E-08
LLRW	m^3	1.97E-04	1.89E-03	1.78E-03	1.55E-03	1.80E-03	2.20E-03	5.11E-03	1.01E-03	1.38E-03	3.10E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7a: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		1097	1097SX	1097SXH	1098S	1098SH	1098SX	1099SH	1099SXH	1145	1145S
Strength	PSI	4000	4000	4000	5000	5000	5000	6000	6000	8750	8750
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	258.81	249.12	250.57	309.66	310.08	291.14	313.60	294.79	373.73	380.32
ODP	kg CFC11e	6.93E-06	7.31E-06	7.31E-06	8.80E-06	8.81E-06	8.34E-06	8.84E-06	8.43E-06	9.73E-06	1.05E-05
AP	kg SO^2e	0.81	0.87	0.87	1.01	1.01	0.96	1.02	0.98	1.09	1.18
EP	kg Ne	0.35	0.35	0.35	0.42	0.42	0.40	0.42	0.40	0.49	0.50
SFP	kg O^3e	16.75	17.10	17.11	19.86	19.93	19.02	20.13	19.42	22.18	23.35
ADPf	MJ, NCV	1598.87	1592.05	1619.40	1899.06	1904.82	1805.93	1966.74	1844.30	2219.25	2300.64
ADPe	kg Sbe	2.61E-04	2.45E-04	2.69E-04	2.86E-04	2.86E-04	2.73E-04	3.33E-04	2.79E-04	3.91E-04	3.87E-04
FFD	MJ Surplus	119.60	123.82	127.92	139.87	140.70	135.11	149.79	139.89	156.88	166.48
Use of Primary Resources											
RPRE	MJ, NCV	82.10	81.54	84.31	98.53	98.72	93.36	104.42	95.14	119.08	123.25
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1734.75	1756.03	1785.32	2083.03	2089.26	1983.86	2155.92	2025.46	2396.06	2511.42
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.29	2.14	2.15	2.72	2.71	2.54	2.73	2.56	3.37	3.37
CCE	kg CO^2e	104.23	96.91	96.91	125.07	125.07	116.42	125.07	117.09	156.34	156.34
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.56E-08	1.53E-08	1.53E-08	1.52E-08	1.52E-08	1.52E-08	1.54E-08	1.55E-08	1.56E-08	1.54E-08
LLRW	m^3	6.85E-04	5.39E-04	1.30E-03	7.54E-04	8.20E-04	7.11E-04	2.23E-03	1.10E-03	1.95E-03	1.95E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		1145SX	1147	1161S	1161SH	1161SXH	1171	1171X	1474SH	1474SXH	1497
Strength	PSI	8750	4000	4000	4000	4000	4000	4000	5000	5000	4000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	361.32	281.51	266.28	268.91	253.37	304.54	285.96	279.44	262.38	301.75
ODP	kg CFC11e	1.01E-05	7.54E-06	7.73E-06	7.74E-06	7.43E-06	8.06E-06	7.62E-06	8.02E-06	7.61E-06	8.05E-06
AP	kg SO^2e	1.14	0.87	0.91	0.92	0.89	0.92	0.87	0.95	0.90	0.91
EP	kg Ne	0.48	0.38	0.37	0.37	0.35	0.41	0.39	0.38	0.36	0.40
SFP	kg O^3e	22.53	17.96	18.09	18.11	17.53	18.84	17.95	18.62	17.81	18.68
ADPf	MJ, NCV	2169.37	1713.68	1691.76	1741.68	1624.70	1842.81	1739.05	1785.77	1692.53	1796.84
ADPe	kg Sbe	3.24E-04	2.76E-04	2.58E-04	3.02E-04	2.67E-04	3.06E-04	2.92E-04	3.11E-04	2.86E-04	2.87E-04
FFD	MJ Surplus	155.09	125.41	130.82	138.30	126.90	133.85	127.07	139.21	133.51	126.99
Use of Primary Resources											
RPRE	MJ, NCV	113.14	88.68	86.62	91.72	83.95	96.84	91.19	94.46	88.53	93.72
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2371.45	1857.61	1862.59	1916.03	1790.93	1994.92	1884.21	1962.91	1863.61	1945.58
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.19	2.50	2.30	2.31	2.18	2.71	2.54	2.41	2.26	2.71
CCE	kg CO^2e	148.58	114.65	104.23	104.23	98.46	125.07	116.87	109.55	101.79	125.07
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.54E-08	1.56E-08	1.54E-08	1.55E-08	1.55E-08	1.54E-08	1.54E-08	1.55E-08	1.55E-08	1.53E-08
LLRW	m^3	7.26E-04	4.17E-04	7.66E-04	2.12E-03	5.12E-04	1.18E-03	8.22E-04	1.73E-03	1.53E-03	6.63E-05
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		1497X	1590S	1598S	1598SX	1606W	1677S	1686S	1686SH	1686SXH	2448S
Strength	PSI	4000	8000	4000	4000	6000	3000	4000	4000	4000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	283.96	355.09	255.57	239.52	359.16	408.57	442.34	444.64	424.64	290.11
ODP	kg CFC11e	7.61E-06	9.77E-06	7.46E-06	7.09E-06	9.40E-06	1.26E-05	1.36E-05	1.36E-05	1.32E-05	8.41E-06
AP	kg SO^2e	0.87	1.10	0.89	0.85	1.05	1.78	1.88	1.89	1.84	0.98
EP	kg Ne	0.38	0.47	0.36	0.34	0.47	0.67	0.71	0.71	0.69	0.40
SFP	kg O^3e	17.80	21.97	17.52	16.78	21.46	24.00	25.81	25.85	24.92	19.15
ADPf	MJ, NCV	1705.47	2144.40	1642.76	1546.17	2140.58	2812.82	3006.45	3050.50	2903.65	1829.38
ADPe	kg Sbe	2.75E-04	3.52E-04	2.63E-04	2.41E-04	3.70E-04	3.35E-04	3.72E-04	4.09E-04	3.45E-04	2.93E-04
FFD	MJ Surplus	122.07	154.81	128.90	121.77	152.11	172.50	185.38	191.96	178.29	139.93
Use of Primary Resources											
RPRE	MJ, NCV	88.78	113.72	84.80	78.93	114.62	196.64	207.84	212.27	201.54	95.70
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1848.22	2337.78	1810.49	1707.41	2312.50	3067.24	3279.29	3326.46	3169.68	2014.81
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.54	3.15	2.20	2.05	3.22	2.59	2.89	2.92	2.75	2.51
CCE	kg CO^2e	116.87	145.92	99.13	92.25	149.69	109.55	124.18	124.18	116.42	114.65
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.53E-08	1.54E-08	1.55E-08	1.55E-08	1.55E-08	3.28E-08	3.28E-08	3.28E-08	3.28E-08	1.53E-08
LLRW	m^3	6.63E-05	1.35E-03	9.82E-04	4.17E-04	1.82E-03	5.07E-04	8.86E-04	2.06E-03	5.44E-04	1.32E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		2448SH	2448SXH	2595S	2595SH	2595SXH	2664S	2664SH	2664SXH	3410S	3410SH
Strength	PSI	5000	5000	5000	5000	5000	4500	4500	4500	5000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	288.92	271.66	268.03	267.53	252.46	265.60	266.00	250.55	257.86	257.85
ODP	kg CFC11e	8.41E-06	7.98E-06	7.89E-06	7.89E-06	7.54E-06	7.84E-06	7.84E-06	7.47E-06	7.79E-06	7.79E-06
AP	kg SO^2e	0.98	0.93	0.93	0.93	0.90	0.92	0.92	0.88	0.93	0.93
EP	kg Ne	0.39	0.37	0.37	0.37	0.35	0.37	0.37	0.35	0.36	0.36
SFP	kg O^3e	19.13	18.31	18.32	18.32	17.67	17.94	17.96	17.30	18.06	18.06
ADPf	MJ, NCV	1806.63	1718.31	1714.51	1706.76	1622.48	1679.62	1685.66	1609.88	1671.41	1671.28
ADPe	kg Sbe	2.72E-04	2.60E-04	2.59E-04	2.59E-04	2.49E-04	2.56E-04	2.57E-04	2.47E-04	2.51E-04	2.51E-04
FFD	MJ Surplus	136.53	131.80	133.69	132.52	126.97	128.64	129.54	125.93	132.27	132.25
Use of Primary Resources											
RPRE	MJ, NCV	93.32	88.49	87.86	87.46	82.84	86.65	86.95	82.66	85.42	85.41
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1990.46	1896.38	1892.71	1884.35	1794.42	1855.05	1861.59	1780.94	1853.87	1853.72
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.50	2.35	2.30	2.30	2.16	2.29	2.30	2.15	2.20	2.19
CCE	kg CO^2e	114.65	106.67	104.23	104.23	97.57	104.23	104.23	96.91	98.90	98.90
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.53E-08	1.53E-08	1.55E-08	1.55E-08	1.55E-08	1.53E-08	1.53E-08	1.54E-08	1.55E-08	1.55E-08
LLRW	m^3	7.19E-04	6.78E-04	9.52E-04	7.12E-04	3.01E-04	4.98E-04	6.56E-04	6.22E-04	7.96E-04	7.93E-04
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7a Continued: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		3410SXH	3411S	3411SH	3411SXH	4246SX	4248SX	4321SX	4331SX	4332SX	4591X
Strength	PSI	5000	6000	6000	6000	8000	6000	12000	5000	5000	10000
	@ days	28	28	28	28	56	56	56	28	28	56
Core Mandatory Impact Indicators											
GWP	kg CO^2e	242.84	290.87	290.41	276.74	275.00	245.72	311.02	275.70	277.57	252.41
ODP	kg CFC11e	7.46E-06	8.70E-06	8.70E-06	8.36E-06	8.32E-06	7.46E-06	9.42E-06	7.93E-06	7.97E-06	7.62E-06
AP	kg SO^2e	0.90	1.02	1.02	0.99	0.99	0.90	1.12	0.92	0.94	0.93
EP	kg Ne	0.34	0.40	0.40	0.38	0.38	0.35	0.42	0.38	0.38	0.35
SFP	kg O^3e	17.44	19.74	19.71	19.06	19.03	17.45	21.13	18.26	18.58	17.90
ADPf	MJ, NCV	1582.64	1865.12	1863.02	1787.16	1787.52	1637.84	2063.12	1729.38	1755.84	1697.34
ADPe	kg Sbe	2.42E-04	2.93E-04	3.14E-04	2.90E-04	3.02E-04	2.90E-04	3.63E-04	2.76E-04	2.78E-04	3.09E-04
FFD	MJ Surplus	125.78	145.68	145.39	140.64	141.82	134.08	168.42	131.32	135.10	140.63
Use of Primary Resources											
RPRE	MJ, NCV	80.61	97.14	98.38	93.32	94.06	86.28	110.66	89.89	90.82	90.01
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	1759.10	2065.99	2063.50	1982.73	1983.21	1818.14	2293.60	1900.83	1929.48	1883.34
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.06	2.49	2.49	2.36	2.34	2.06	2.59	2.39	2.39	2.10
CCE	kg CO^2e	92.47	113.10	113.10	106.89	105.78	92.47	118.20	109.33	109.33	94.47
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	1.56E-08	1.54E-08	1.54E-08	1.54E-08	1.55E-08	1.55E-08	1.55E-08	1.53E-08	1.55E-08	1.56E-08
LLRW	m^3	1.51E-04	1.45E-03	1.36E-03	1.18E-03	1.38E-03	1.69E-03	3.91E-03	7.70E-04	1.05E-03	2.37E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7b: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		1097	1097SX	1097SXH	1098S	1098SH	1098SX	1099SH	1099SXH	1145	1145S
Strength	PSI	4000	4000	4000	5000	5000	5000	6000	6000	8750	8750
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	338.08	325.41	327.30	404.49	405.04	380.31	409.65	385.06	488.18	496.79
ODP	kg CFC11e	9.05E-06	9.55E-06	9.55E-06	1.15E-05	1.15E-05	1.09E-05	1.15E-05	1.10E-05	1.27E-05	1.37E-05
AP	kg SO^2e	1.06	1.13	1.14	1.31	1.32	1.26	1.34	1.28	1.42	1.55
EP	kg Ne	0.46	0.45	0.46	0.55	0.55	0.52	0.55	0.52	0.64	0.65
SFP	kg O^3e	21.88	22.34	22.35	25.94	26.03	24.85	26.29	25.36	28.98	30.50
ADPf	MJ, NCV	2088.53	2079.62	2115.34	2480.65	2488.17	2359.00	2569.05	2409.12	2898.90	3005.22
ADPe	kg Sbe	3.41E-04	3.21E-04	3.51E-04	3.73E-04	3.74E-04	3.57E-04	4.35E-04	3.64E-04	5.11E-04	5.06E-04
FFD	MJ Surplus	156.23	161.74	167.09	182.71	183.79	176.49	195.67	182.73	204.93	217.47
Use of Primary Resources											
RPRE	MJ, NCV	107.24	106.51	110.14	128.70	128.96	121.95	136.40	124.27	155.55	161.00
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2266.02	2293.82	2332.08	2720.96	2729.10	2591.41	2816.18	2645.76	3129.86	3280.55
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.99	2.80	2.81	3.55	3.54	3.31	3.57	3.34	4.40	4.40
CCE	kg CO^2e	136.15	126.59	126.59	163.37	163.37	152.08	163.37	152.95	204.22	204.22
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	2.04E-08	2.00E-08	2.00E-08	1.98E-08	1.99E-08	1.99E-08	2.02E-08	2.03E-08	2.04E-08	2.01E-08
LLRW	m^3	8.94E-04	7.03E-04	1.70E-03	9.84E-04	1.07E-03	9.28E-04	2.91E-03	1.43E-03	2.54E-03	2.54E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		1145SX	1147	1161S	1161SH	1161SXH	1171	1171X	1474SH	1474SXH	1497
Strength	PSI	8750	4000	4000	4000	4000	4000	4000	5000	5000	4000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	471.98	367.73	347.83	351.27	330.97	397.80	373.53	365.02	342.74	394.17
ODP	kg CFC11e	1.32E-05	9.86E-06	1.01E-05	1.01E-05	9.71E-06	1.05E-05	9.95E-06	1.05E-05	9.93E-06	1.05E-05
AP	kg SO^2e	1.48	1.14	1.19	1.20	1.16	1.20	1.14	1.23	1.18	1.19
EP	kg Ne	0.63	0.50	0.48	0.48	0.46	0.53	0.50	0.50	0.47	0.53
SFP	kg O^3e	29.43	23.46	23.63	23.66	22.90	24.61	23.45	24.32	23.27	24.40
ADPf	MJ, NCV	2833.75	2238.49	2209.87	2275.07	2122.27	2407.18	2271.64	2332.67	2210.87	2347.12
ADPe	kg Sbe	4.23E-04	3.60E-04	3.37E-04	3.94E-04	3.48E-04	4.00E-04	3.82E-04	4.07E-04	3.73E-04	3.75E-04
FFD	MJ Surplus	202.59	163.82	170.89	180.66	165.76	174.84	165.99	181.84	174.40	165.88
Use of Primary Resources											
RPRE	MJ, NCV	147.79	115.84	113.14	119.81	109.66	126.50	119.11	123.39	115.64	122.43
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	3097.71	2426.51	2433.01	2502.81	2339.41	2605.87	2461.25	2564.05	2434.34	2541.42
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	4.17	3.27	3.00	3.02	2.85	3.54	3.32	3.15	2.95	3.53
CCE	kg CO^2e	194.08	149.76	136.15	136.15	128.61	163.37	152.66	143.10	132.96	163.37
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	2.01E-08	2.04E-08	2.02E-08	2.02E-08	2.02E-08	2.01E-08	2.01E-08	2.02E-08	2.02E-08	2.00E-08
LLRW	m^3	9.48E-04	5.44E-04	1.00E-03	2.77E-03	6.68E-04	1.54E-03	1.07E-03	2.26E-03	2.00E-03	8.66E-05
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		1497X	1590S	1598S	1598SX	1606W	1677S	1686S	1686SH	1686SXH	2448S
Strength	PSI	4000	8000	4000	4000	6000	3000	4000	4000	4000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	370.92	463.84	333.83	312.88	469.15	533.69	577.81	580.81	554.69	378.96
ODP	kg CFC11e	9.94E-06	1.28E-05	9.75E-06	9.26E-06	1.23E-05	1.65E-05	1.77E-05	1.78E-05	1.72E-05	1.10E-05
AP	kg SO^2e	1.13	1.44	1.16	1.11	1.38	2.33	2.46	2.47	2.40	1.28
EP	kg Ne	0.50	0.61	0.46	0.44	0.62	0.88	0.93	0.93	0.90	0.52
SFP	kg O^3e	23.26	28.70	22.89	21.92	28.03	31.35	33.72	33.76	32.55	25.02
ADPf	MJ, NCV	2227.77	2801.13	2145.86	2019.69	2796.14	3674.25	3927.19	3984.72	3792.90	2389.63
ADPe	kg Sbe	3.59E-04	4.59E-04	3.44E-04	3.14E-04	4.83E-04	4.38E-04	4.85E-04	5.34E-04	4.51E-04	3.83E-04
FFD	MJ Surplus	159.45	202.22	168.37	159.06	198.69	225.33	242.15	250.75	232.89	182.79
Use of Primary Resources											
RPRE	MJ, NCV	115.96	148.54	110.78	103.10	149.72	256.86	271.49	277.28	263.26	125.00
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2414.25	3053.74	2364.95	2230.30	3020.71	4006.58	4283.59	4345.19	4140.40	2631.85
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.32	4.11	2.87	2.68	4.21	3.38	3.77	3.81	3.59	3.27
CCE	kg CO^2e	152.66	190.60	129.48	120.50	195.53	143.10	162.22	162.22	152.08	149.76
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	2.00E-08	2.01E-08	2.02E-08	2.02E-08	2.02E-08	4.29E-08	4.29E-08	4.29E-08	4.28E-08	2.00E-08
LLRW	m^3	8.66E-05	1.76E-03	1.28E-03	5.44E-04	2.37E-03	6.62E-04	1.16E-03	2.69E-03	7.11E-04	1.72E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		2448SH	2448SXH	2595S	2595SH	2595SXH	2664S	2664SH	2664SXH	3410S	3410SH
Strength	PSI	5000	5000	5000	5000	5000	4500	4500	4500	5000	5000
	@ days	28	28	28	28	28	28	28	28	28	28
Core Mandatory Impact Indicators											
GWP	kg CO^2e	377.41	354.86	350.11	349.46	329.78	346.94	347.46	327.28	336.83	336.82
ODP	kg CFC11e	1.10E-05	1.04E-05	1.03E-05	1.03E-05	9.85E-06	1.02E-05	1.02E-05	9.75E-06	1.02E-05	1.02E-05
AP	kg SO^2e	1.27	1.22	1.22	1.22	1.17	1.20	1.20	1.15	1.21	1.21
EP	kg Ne	0.52	0.49	0.48	0.48	0.46	0.48	0.48	0.46	0.47	0.47
SFP	kg O^3e	24.99	23.92	23.93	23.93	23.08	23.43	23.46	22.60	23.60	23.59
ADPf	MJ, NCV	2359.91	2244.55	2239.58	2229.46	2119.37	2194.00	2201.90	2102.91	2183.29	2183.11
ADPe	kg Sbe	3.55E-04	3.40E-04	3.38E-04	3.38E-04	3.25E-04	3.35E-04	3.35E-04	3.22E-04	3.28E-04	3.28E-04
FFD	MJ Surplus	178.35	172.17	174.63	173.11	165.85	168.04	169.21	164.50	172.77	172.75
Use of Primary Resources											
RPRE	MJ, NCV	121.90	115.59	114.76	114.24	108.20	113.19	113.58	107.97	111.58	111.57
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2600.04	2477.15	2472.35	2461.44	2343.97	2423.16	2431.71	2326.36	2421.62	2421.43
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	3.26	3.07	3.01	3.01	2.82	2.99	3.01	2.81	2.87	2.86
CCE	kg CO^2e	149.76	139.33	136.15	136.15	127.46	136.15	136.15	126.59	129.19	129.19
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	2.00E-08	2.00E-08	2.02E-08	2.02E-08	2.03E-08	2.00E-08	2.00E-08	2.01E-08	2.02E-08	2.02E-08
LLRW	m^3	9.39E-04	8.86E-04	1.24E-03	9.31E-04	3.93E-04	6.50E-04	8.58E-04	8.12E-04	1.04E-03	1.04E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7b Continued: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Evanston

Mix ID		3410SXH	3411S	3411SH	3411SXH	4246SX	4248SX	4321SX	4331SX	4332SX	4591X
Strength	PSI	5000	6000	6000	6000	8000	6000	12000	5000	5000	10000
	@ days	28	28	28	28	56	56	56	28	28	56
Core Mandatory Impact Indicators											
GWP	kg CO^2e	317.21	379.95	379.35	361.49	359.23	320.97	406.27	360.13	362.58	329.71
ODP	kg CFC11e	9.74E-06	1.14E-05	1.14E-05	1.09E-05	1.09E-05	9.74E-06	1.23E-05	1.04E-05	1.04E-05	9.96E-06
AP	kg SO^2e	1.17	1.34	1.34	1.29	1.29	1.18	1.46	1.21	1.22	1.21
EP	kg Ne	0.45	0.52	0.52	0.50	0.50	0.45	0.55	0.49	0.50	0.46
SFP	kg O^3e	22.78	25.79	25.74	24.90	24.85	22.79	27.60	23.86	24.28	23.38
ADPf	MJ, NCV	2067.33	2436.32	2433.58	2334.49	2334.95	2139.44	2694.95	2259.00	2293.58	2217.15
ADPe	kg Sbe	3.16E-04	3.83E-04	4.11E-04	3.78E-04	3.95E-04	3.79E-04	4.74E-04	3.60E-04	3.64E-04	4.03E-04
FFD	MJ Surplus	164.30	190.30	189.91	183.71	185.25	175.14	220.00	171.54	176.48	183.70
Use of Primary Resources											
RPRE	MJ, NCV	105.29	126.89	128.51	121.90	122.86	112.70	144.54	117.42	118.64	117.57
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2297.83	2698.70	2695.45	2589.95	2590.57	2374.96	2996.03	2482.97	2520.38	2460.12
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy											
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters											
FW	m^3	2.69	3.25	3.25	3.08	3.05	2.70	3.38	3.12	3.13	2.74
CCE	kg CO^2e	120.79	147.73	147.73	139.62	138.17	120.79	154.39	142.81	142.81	123.40
Indicators Describing Waste											
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	2.03E-08	2.02E-08	2.01E-08	2.02E-08	2.02E-08	2.03E-08	2.02E-08	1.99E-08	2.02E-08	2.04E-08
LLRW	m^3	1.97E-04	1.89E-03	1.78E-03	1.55E-03	1.80E-03	2.20E-03	5.11E-03	1.01E-03	1.38E-03	3.10E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 8a: LCA Results (A1-A3) for Ready Mix Concrete per yd^3
Ozinga Ready Mix Concrete – Miami 17th Avenue

Mix ID		A243LR40	A243LH40	1085FH1	1092FH	1110FPH	1120FRPHR	1120FPH	1140CAL
Strength	PSI	6000	6000	6500	7200	9000	10000	10000	12000
	@ days	28	28	28	28	56	56	56	56
Core Mandatory Impact Indicators									
GWP	kg CO^2e	327.01	327.23	373.91	339.57	379.46	545.68	399.51	436.34
ODP	kg CFC11e	9.39E-06	9.29E-06	1.00E-05	1.04E-05	1.18E-05	1.41E-05	1.24E-05	1.37E-05
AP	kg SO^2e	0.92	0.91	0.97	1.06	1.23	1.38	1.28	1.45
EP	kg Ne	0.42	0.42	0.48	0.44	0.49	0.68	0.52	0.57
SFP	kg O^3e	18.06	17.89	19.50	19.71	22.40	27.37	23.41	25.82
ADPf	MJ, NCV	1846.23	1852.60	2066.27	2030.14	2296.78	3042.30	2430.43	2764.53
ADPe	kg Sbe	3.02E-04	3.03E-04	3.39E-04	3.28E-04	3.57E-04	4.90E-04	3.72E-04	4.39E-04
FFD	MJ Surplus	118.32	119.64	128.42	143.13	164.93	194.25	176.27	212.99
Use of Primary Resources									
RPRE	MJ, NCV	105.30	105.73	117.91	115.54	129.77	172.82	137.03	157.20
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2008.41	2011.25	2220.68	2242.37	2551.99	3262.21	2699.17	3083.82
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy									
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters									
FW	m^3	3.03	3.03	3.50	3.04	3.35	5.04	3.51	3.74
CCE	kg CO^2e	140.82	140.82	164.10	140.37	155.23	239.50	162.99	172.97
Indicators Describing Waste									
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	39.15	39.15	39.15	39.15	39.15	39.15	39.15	39.15
HLRW	m^3	8.73E-09	8.76E-09	8.82E-09	8.53E-09	8.57E-09	8.73E-09	8.58E-09	8.96E-09
LLRW	m^3	5.65E-04	1.13E-03	1.51E-03	2.84E-03	3.63E-03	5.93E-03	4.69E-03	8.62E-03
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 8b: LCA Results (A1-A3) for Ready Mix Concrete per m^3
Ozinga Ready Mix Concrete – Miami 17th Avenue

Mix ID		A243LR40	A243LH40	1085FH1	1092FH	1110FPH	1120FRPHR	1120FPH	1140CAL
Strength	PSI	6000	6000	6500	7200	9000	10000	10000	12000
	@ days	28	28	28	28	56	56	56	56
Core Mandatory Impact Indicators									
GWP	kg CO^2e	427.16	427.45	488.43	443.57	495.67	712.79	521.86	569.97
ODP	kg CFC11e	1.23E-05	1.21E-05	1.31E-05	1.35E-05	1.55E-05	1.84E-05	1.61E-05	1.79E-05
AP	kg SO^2e	1.20	1.19	1.26	1.38	1.60	1.80	1.68	1.89
EP	kg Ne	0.55	0.55	0.62	0.58	0.65	0.88	0.68	0.74
SFP	kg O^3e	23.60	23.37	25.48	25.74	29.26	35.75	30.58	33.72
ADPf	MJ, NCV	2411.64	2419.97	2699.07	2651.87	3000.18	3974.01	3174.76	3611.17
ADPe	kg Sbe	3.95E-04	3.96E-04	4.43E-04	4.29E-04	4.66E-04	6.40E-04	4.86E-04	5.74E-04
FFD	MJ Surplus	154.56	156.28	167.74	186.96	215.44	253.73	230.26	278.22
Use of Primary Resources									
RPRE	MJ, NCV	137.54	138.11	154.02	150.92	169.52	225.75	178.99	205.34
RPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRPRE	MJ, NCV	2623.49	2627.19	2900.76	2929.10	3333.55	4261.27	3525.79	4028.24
NRPRM	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy									
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters									
FW	m^3	3.96	3.96	4.57	3.97	4.38	6.59	4.59	4.89
CCE	kg CO^2e	183.94	183.94	214.36	183.36	202.77	312.84	212.91	225.94
Indicators Describing Waste									
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	51.14	51.14	51.14	51.14	51.14	51.14	51.14	51.14
HLRW	m^3	1.14E-08	1.14E-08	1.15E-08	1.11E-08	1.12E-08	1.14E-08	1.12E-08	1.17E-08
LLRW	m^3	7.37E-04	1.47E-03	1.97E-03	3.71E-03	4.74E-03	7.74E-03	6.13E-03	1.13E-02
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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