Protecting Our Water Environment

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

Beneficial Reuse of Biosolids

VOLUME 1

CONSTRUCTING PARKS, GOLF COURSES, AND ATHLETIC FIELDS USING BIOSOLIDS

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Compiled by Dr. Hundal

INTRODUCTION

Background

The Metropolitan Water Reclamation District (District) of Greater Chicago is an internationally acclaimed organization that collects and treats the municipal and industrial wastewater generated by Chicago and 124 suburban communities in Cook County, Illinois. The District was founded in 1889 and is currently covering a service area of approximately 872 miles with a present population equivalent to 10.1 million people. The District owns and operates seven water reclamation plants (WRPs) having a combined capacity to treat about 2,000 million gallons of wastewater per day. Currently the District is reclaiming an average of approximately 1.5 billion gallons of wastewater daily and is producing about 190,000 dry tons of biosolids per year.

How Are Biosolids Produced?

The water reclamation process produces sewage sludge which is further processed by the District over a two to three years period to produce a highly stable, topsoil like product called **biosolids**. This treatment includes destruction of unwanted microorganisms and odorous compounds by anaerobic digestion of sludge for approximately one month, storage of sludge for a minimum of 18 months in large lagoons for further digestion, and stabilization, and air drying by mechanical agitation for two months on paved beds - a process that mimics composting. Emerging from this rigorous treatment process are biosolids.

Biosolids are a topsoil-like material that contain 35 percent organic matter and have a silt loam texture, similar to that of the surface horizon of our native prairie soils. In addition to being rich in organic matter, the biosolids contain an abundance of essential plant nutrients including nitrogen, phosphorus, sulfur, calcium, magnesium, potassium, and iron. These attributes make biosolids an ideal substitute for expensive topsoil and an effective soil conditioner that can improve fertility and productivity of almost any land it is applied to. The biosolids have been utilized successfully throughout the Chicago metropolitan area to construct and maintain golf courses, parks, athletic fields, and final landfill covers, and in rural Fulton County Illinois to reclaim strip-mined soils for corn and soybean production. Because the biosolids are rich in organic matter and essential plant nutrients they can provide the enrichment necessary to successfully establish vegetation on disturbed or depleted soils such as we typically find in the urban environment.

Monitoring Quality and Ensuring Safe Use of Biosolids

The District is committed to serving its constituency by producing biosolids that can be safely recycled on land to the economic benefit of the recipients. In order to ensure that this can be done safely and successfully, the District supports a Research and Development Department of over 350 professionals including pollution control officers who monitor and limit the discharge of pollutants from local industries to our sewers, and civil and environmental engineers, soil scientists, biologists, virologists, microbiologists, chemists, radiologists and biostatisticians who study biosolids treatment and recycling. The District has published over 250 research reports resulting from its long history of researching and monitoring the safety of land application of biosolids. The District has also conducted cooperative research with the University of Illinois, New Mexico State University, the University of California, Illinois State University, the University of Florida, Oklahoma State University, the United

States Department of Agriculture, the United States Environmental Protection Agency (USEPA) and Environment Canada on the safety of utilizing it's biosolids on land.

The District's biosolids comply with all local, state and federal regulations governing land application. The USEPA has issued biosolids use regulations that are based on an extensive risk assessment. This risk assessment utilized data from hundreds of research studies published worldwide to model 14 routes of exposure of humans, animals, and other sensitive environmental endpoints to pollutants in land applied biosolids to produce the rule's pollutant concentration limits.

Among the exposure pathways that the USEPA's biosolids rule protects are: Direct ingestion of biosolids by children, inhalation of airborne dust from biosolids application sites by both workers applying the biosolids and nearby residents, consumption of ground water from underneath a biosolids application site, and consumption of vegetables grown on biosolids amended land. The USEPA's biosolids regulation defines exceptional quality (EQ) biosolids, a designation that requires that biosolids meet the most stringent pollutant concentration limits, pathogen reduction criteria and vector attraction reduction criteria in the rule. All District biosolids released to public distribution meet and exceed the EQ criteria of USEPA's biosolids rule ensuring the safety of anyone who comes in contact with them.

The District's Research and Development Department conducts in excess of one million analyses annually, monitoring the industrial inputs to our treatment plants and the quality of our biosolids to ensure that the USEPA's biosolids EQ limits are met and public safety is protected.

As a result of this aggressive program of industrial waste control the mean concentration of the regulated pollutants in District biosolids is well below even the most stringent standards set by the USEPA.

Beneficial Reuse of Biosolids

The numbers of sites at which the biosolids have been successfully utilized in the Chicago Metropolitan area are too numerous to list in their entirety. However, here are some familiar examples that you may recognize. Biosolids have been used as a topsoil substitute to construct the Water's Edge Golf Course in Worth and the Harborside International Golf Club in Chicago, a course that has hosted professional golf events. Biosolids have been used as a soil conditioner and fairway top dressing at the Meadows Golf Course in Blue Island, at Hickory Hills Golf Club in Hickory Hills and at North Shore Country Club in Glenview. Biosolids have been used as a topsoil substitute or soil conditioner in the construction of many public parks including the Riverfront Sculpture Park along the Chicago River in Chicago, Melas Park in Mount Prospect, and Riverfront Renaissance Park in Worth. In addition, biosolids have been utilized as a soil conditioner in constructing many athletic fields including De La Salle High School in Chicago, St. Joseph High School in Westchester and most recently at Morton West High School in Berwyn.

Morton West High School Project: The recent Morton West High School project can be used to illustrate typical beneficial use of biosolids as a soil conditioner in the Chicago metropolitan area. In the spring of 2000, a 5-acre parcel of land on the high school grounds was designated for use as a soccer field. The field consisted of a shallow, infertile, low organic matter rocky clay loam surface layer underlain by a dense rocky

subsoil layer. The clayey shallow surface layer and dense subsoil were not suitable for turf establishment, because they physically restricted root growth and had limited capacity to store soil moisture and nutrients. Either topsoil or addition of soil conditioner was needed to enable successful establishment of turf. Biosolids were selected as the soil conditioner because they would increase fertility, organic matter content, and aeration of the surface soil. Also, biosolids would increase available rooting depth and storage capacity for moisture and nutrients.

The biosolids were spread to an approximately 2-inch thick layer over the soil surface and were blended with the surface 1 to 3 inches of soil to create a 3 to 5-inch deep seedbed. The field was then directly seeded in early July with a seed mixture consisting of 50% Kentucky bluegrass and 50% Perennial ryegrass, two common turf species used on athletic fields in the Chicagoland area. By late fall of 2000 the field was completely covered by lush green healthy turf and it was put into service in the spring/summer of 2001. No artificial fertilizer, at least during the first year of turf establishment was required.

Biosolids use was beneficial to this project both as a soil substitute and for its fertilizer value. The cost of spreading and incorporating of biosolids was about $50 per dry ton.

The 5-inch deep seedbed on the 5-acre field was produced at a cost of approximately $6,400 utilizing biosolids and would have cost $40,333 if a layer of topsoil was used instead of the biosolids mixture (assuming $12 per cubic yard of topsoil with no spreading cost).

This represents a huge saving for the biosolids user and a benefit to the local community. Details of this and other selected case studies are also given in this booklet.

Have Questions or Need Technical Help?

For detailed information about biosolids use and technical help, please call Dr. Thomas C. Granato, Soil Scientist III, Research and Development Department at (708) 588-4063.

Are Biosolids Available?

For availability of biosolids, please call:

Susan O'Connell at (312) 751-6550

MORTON WEST HIGH SCHOOL

Location: 2400 S. Home Ave., Berwyn, IL

Biosolids Use: Establishment of Soccer Field

Project Date: June 2000

Size of Site: 5 acres

Description of Biosolids: Anaerobically-digested, lagoon-aged, air-dried biosolids from the Calumet water reclamation plant were used on the soccer field. The biosolids met the exceptional quality criteria established in the 40 CFR Part 503 rule of the USEPA.

Description of Soil: The soccer field was prepared for application of biosolids by grading and leveling. After grading, large rocks in the surface 2 to 3 inches of the soil were removed using a tractor-mounted rock picker. The prepared field consisted of a shallow (2-3 inches), slightly alkaline (pH 7.5), infertile, low organic matter rocky clay loam surface layer underlain by a dense rocky subsoil layer, which are not highly suitable for turf establishment. Addition of biosolids to this field would increase fertility, organic matter content, and aeration of the surface soil. Also, biosolids would increase available rooting depth and storage capacity for moisture and nutrients.

Biosolids Application Methods/Quantity: Approximately, 640 dry tons of air-dried biosolids (38% moisture) were delivered to the 5-acre field in late June 2000. This is equivalent to an application rate of about 128 dry tons per acre. The biosolids were spread to a two-inch layer over the soil surface using a Bobcat loader. A tractor-mounted rock picker, fitted with leveling implement was used to blend biosolids with the surface 1 to 3 inches of soil to create a 3 to 5-inch deep seedbed of equal amounts of biosolids and soil (Photographs 1 & 2). After leveling, the field was compacted lightly with a roller to minimize the potential for erosion during any rain events that may occur before the turf is established.

Description of Vegetation Used: The field was directly seeded in early July with a seed mixture consisting of 50% Kentucky bluegrass (var. Marquis-50%, Limousine-50%) and 50% Perennial ryegrass (var. Headstart-50% and, Calypso II-48%). After seeding, the field was rolled lightly then hydromulched. The field was irrigated immediately after seeding and intermittently during germination and establishment.

Benefits Obtained from Use of Biosolids: Biosolids use was beneficial to this project both as a soil substitute and for its fertilizer value. The cost of spreading and incorporation of biosolids was about $50 per dry ton. The 5-inch deep seedbed was produced at a cost of about $6,400 utilizing biosolids and would have cost $40K if topsoil alone was used instead (≈$12 per cubic yard with no spreading cost).

Establishment of healthy turf requires high amounts of soil nutrients, especially nitrogen (N) and phosphorus (P). Soil analysis after incorporation of biosolids showed that the seedbed was well fortified with plant available N (250 pounds N per acre), P (630 pounds P per acre), and other nutrients. The soccer field required no artificial fertilizer, at least during the first year of turf establishment.

Contacts (For More Information):

Mr. Jim Skonecki, Director
Director, Buildings & Grounds
Morton West High School
2400 Home Ave Berwyn, IL

Phone: (708) 222-5795

Prepared by Dr. Albert Cox

Photograph 1.

Biosolids spreaded with Bobcat loader

Photograph 2.

Biosolids incorpo-rated with rock picker

Photograph 3.

Turf established on biosolids-amended soil - Ten weeks after seeding

CINDER RIDGE GOLF LINKS

Location: 24801 Lakepoint Dr, Wilmington

Biosolids Use: Chemical fertilizer substitute for top dressing the turf grasses.

Project Date: September 1998 to date

Size of Site: 60 acres

Description *of Biosolids:* The biosolids used at the Cinder Ridge Golf course were processed to achieve Class A and Exceptional Quality status under regulations promulgated by the Illinois Environmental Protection Agency and USEPA. Briefly, the biosolids were anaerobically-digested, lagoon-aged for at least 18 months, and agitation-dried on paved drying cells to achieve 60-65% solids content.

Description of Site and Soil: The Cinder Ridge Golf Links is a 350-acre site near Wilmington, Illinois (Photograph 1). The 18-hole golf course was established on strip mine spoil using cinder and other coal refuse materials such as red and gray clay, overburden, sand, and wash fines that resulted from the past surface mining activities at the site. Additional amendments and fertilizer are needed for turf establishment because this material has poor fertility status (Photograph 2).

Biosolids Application Method/Quantity: Biosolids were delivered to the site in 20 cubic yard semi-trailers that were unloaded in a designated area. In some instances, the biosolids were passed through a 0.5-inch screen before application to achieve a uniform particle size, which is necessary to ensure uniform spreading. The biosolids were applied using a tractor driven fertilizer spreader (Photograph 3). Heavier application was done using a bulldozer (Photograph 4). The application of biosolids began in 1998. Approximately 4,100 dry tons of biosolids were applied from 1998 through 2002 to about a 60-acre area of roughs, fairways, and tees. The biosolids have successfully replaced Milorganite and other fertilizers, and since 1998 biosolids alone have been used for fertilizing the turfgrass at the Cinder Ridge Golf Course.

Description of Turf Grass Fertilized with Biosolids: The turf grasses used at the Cinder Ridge Golf Course are composed of various blends of creeping bentgrass variety pennlinks, Kentucky bluegrass, perennial rye, and fine fescues. Biosolids were applied on roughs, fairways, and tees. The roughs received a very heavy application of biosolids, i.e., about twice the amount that was applied to the fairways and tees on a unit area basis (Photographs 3 & 4).

User's Needs and Concerns: To ensure uniform spreading and proper application, the biosolids should be dried to 60 to 65% solids content and the material has to be screened to remove larger particles (>1 cm). Wetter biosolids are harder to apply and biosolids dried beyond 70% solids content may create a dust cloud during application.

Benefits of Biosolids Use: The use of biosolids at Cinder Ridge Golf Course produced thicker and healthier turf than was produced with commercial fertilizers.

> *"I am helping in recycling and protecting the environment, my turf is thicker and healthier than ever, and I am saving about $20 –25 thousands a year"*

Says George Kappos, the owner and operator of the Cinder Ridge Golf Course.

Contacts (For More Information):

Mr. George Kappos, Owner/Operator
24801 Lakepoint Drive
Wilmington, IL 60481

Phone: (815) 476-4000
Prepared by Dr. Lakhwinder Hundal

Photograph 1. Cinder Ridge Golf Links.

Photograph 3. After completion of biosolids spreading.

Photograph 2. Preview of the Coal Refuse Materials.

Photograph 4. Use of Bulldozer for Heavier Application of Biosolids to Roughs. (A) Before biosolids Application. (B) After biosolids Application.

HICKORY HILLS GOLF CLUB

Location: 8201 W 95 St., Hickory Hills, IL

Biosolids Use: As a soil conditioner, and for top dressing Fairways, Roughs, Tees, & Greens.

Project Date: Started in 1998

Size of Site: 120 acres

Description of Biosolids: The biosolids used at this site were anaerobically digested, lagoon-aged (minimum 18 months) to achieve Class A material. This material was dried to a solids content of at least 60% on paved drying cells at the Calumet East Solids Management Area. Before application, the dried material was passed through a 0.5-inch screen to remove any stones and other debris. All biosolids utilized in this project met the Illinois and USEPA's 40 CFR Part 503 requirements.

Description of Soil: The soil in several locations of this site may be classified as compacted clay, clay loam in other areas, and a loamy overlay elsewhere. The clay layer varies in depth from area to area. Some areas below the turf contain a large number of small stones.

Biosolids Application Method/Quantity: From 1998 through 2002, a total of 4,209 dry tons of biosolids were delivered to the Hickory Hills Country Club. The biosolids were mixed with topsoil in a 1:1 or 3:1 ratio, and the mixtures broadcast manually over the fairways, roughs, and tees to produce a one-half to one-inch layer, then spread mechanically. In those areas requiring turf rehabilitation, the biosolids were semi-incorporated with a rototiller. In addition, the greens were top-dressed with a mixture of equal quantities of sand, topsoil, and biosolids.

Description of Vegetation Used with Biosolids: The site consists of an 18-hole golf course and driving range, and 9 additional holes, i.e. a total of 27 holes. The following turf species were planted in the indicated areas:

The greens were planted with creeping bentgrass cvr Providence. The shaded fairways and roughs were planted with a 3-way mix consisting of Kentucky bluegrass (KBG) cvr SR 2000 (10%), KBG cvr SR 2100 (30%), KBG cvr SR 2109 (20%), perennial ryegrass cvr SR 4200 (20%), and fine fescue cvr SR 5000 (20%). The fairways were planted with an 80:20 mix consisting of KBG cvr Arcadia (29.75%), KBG cvr Merritt (24.74%), KBG cvr Blue Knight (24.59%), and perennial ryegrass cvr SR 4200 (19.83%).

Contacts (for more information):

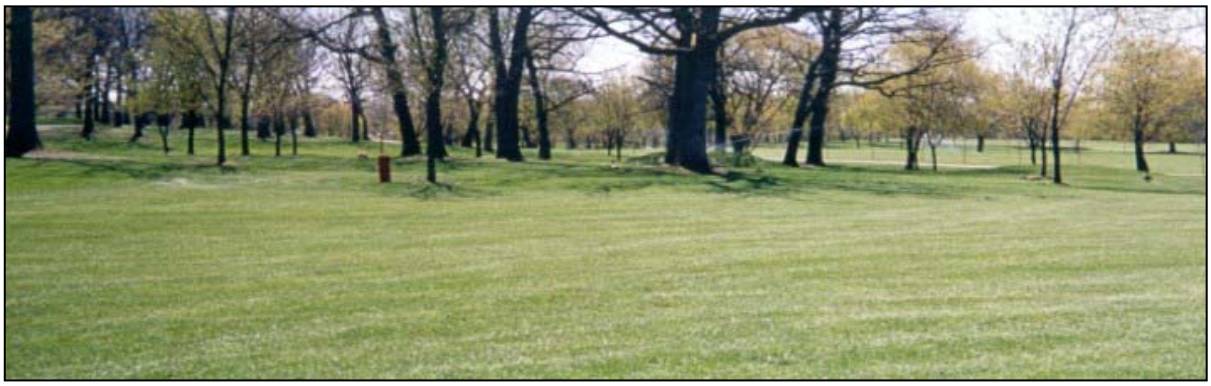
Mr. Steven Gianakus, Owner
Hickory Hills Country Club
8201 W 95th Street
Hickory Hills, IL 60457

Phone: (815) 476-4000

Prepared by Dr. Pauline Lindo

Photograph 1. Mixtures of topsoil and biosolids for application to tees, fairways, and roughs.

Photograph 2. Biosolids surface-applied in fall 2002 produce lush fairways in spring 2003.



Photograph 3. Brown patches and sparse turf in shaded roughs have been rejuvenated following biosolids applications.

WATER'S EDGE GOLF COURSE

Location: 115th Street & Harlem Ave., Worth, IL

Biosolids Use: Establishment of Golf Course

Project Date: August 1997

Size of Site: 95 acres

Description of Biosolids: The biosolids used in this project were anaerobically digested, lagoon aged (minimum 18 months), and air-dried on paved drying cells to achieve greater than 60% solids content. All biosolids utilized in this project met the exceptional quality criteria set forth in the United States Environmental Protection Agency's 40 CFR Part 503 regulation. Biosolids from both the Stickney and Calumet Water Reclamation Plants were utilized.

Description of Soil: The soil that existed on the site consisted largely of compacted material that was excavated from the adjacent Cal-Sag channel during its construction in the late 1800's/early 1900's. This clay textured soil contained a high proportion of pebbles, stones and rocks and was unsuitable for use in establishing golf course turf (Photograph 1).

Biosolids Application Method/Quantity: Nearly 60,000 dry tons of biosolids were applied to the 95-acre site. This produced a mean application rate of 632 tons/acre, which amounted to a layer of biosolids approximately 8 inches thick across the entire site. The air-dried biosolids were delivered in 20 cubic yard semi-trailers and were unloaded throughout the site in close proximity to where they were intended to be spread (Photograph 2). The biosolids were spread with a bulldozer to ensure that a uniform application was made (Photograph 3). However, due to the compact nature of the underlying soil and the fact that it was strewn with stones and rocks, the biosolids were never incorporated with it. The entire site, except the greens and tees, was covered with an approximately 8-inch layer of pure biosolids.

Description of Vegetation Used with Biosolids: The site consists of an 18-hole golf course and driving range. Following is a description of the turf that was planted:

1. Fairways – creeping bentgrass v. pennlinks
2. Rough – Kentucky bluegrass (60%) v. midnight, unique, Columbia perennial ryegrass (20%) v. alliance (blend) Chewings fescue (20%) v. Tiffany

The turf was established from seed except on the aprons of the greens, tees and bunkers (Photograph 4). Kentucky bluegrass sod was placed on these aprons. The turf was seeded in the fall (late August through early October) of 1997. The site was irrigated after planting and received supplemental irrigation throughout the growing season.

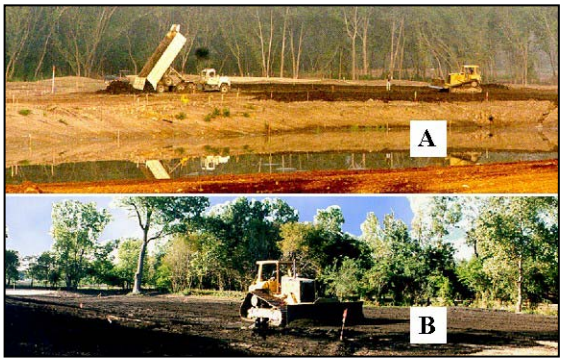
Contacts (For More Information):

Mr. Jason Lemanski, Superintendent
Water's Edge Golf Course
115th Street & Harlem Ave.
Worth, IL

Phone: (708) 671-1480

Prepared by Dr. Thomas Granato

Photograph 1. A typical Fairway at the beginning of project. Note that stones and pebbles are clearly visible.



Photograph 2. Biosolids are being unloaded from semi-Trailers (A) and being leveled to a desired depth using bulldozer scraper blades (B).

Photograph 3. After completion of biosolids spreading.

Photograph 4. Roughs and Fairways after completion of project.

CHICAGO RIVER PARK

Location: 400 E. Lower Wacker Drive, Chicago, IL

Biosolids Use: Establishment of Park.

Project Date: December 1988

Size of Site: 4 acres

Description of Biosolids: The biosolids used in this project were anaerobically digested, lagoon aged (minimum 18 months), and air-dried on paved drying cells to approximately 60% solids content. All biosolids utilized in this project complied fully with the Illinois Environmental Protection Agency and United States Environmental Protection Agency's regulations governing land application. Biosolids from both the Stickney and Calumet WRPs were utilized.

Description of Soil: The soil that existed on the site consisted largely of compacted clayey material that was unsuitable for establishing turf grass and ornamental trees (Figure 1). The soil on the south half of the site also had elevated salt content due to the fact that runoff from Wacker Dr. above the site was being discharged to this land.

Biosolids Application Method/Quantity: Approximately 2,600 dry tons of biosolids were applied to this 4-acre site, which produced a mean application rate of 650 tons/acre. The air-dried biosolids were delivered in 20 cubic yard semi-trailers and were unloaded throughout the site in close proximity to where they were intended to be spread. The biosolids were spread with a bulldozer to ensure uniform application. The biosolids were incorporated, to some extent, with the underlying soil where turf was to be planted (Photograph 1).

Description of Vegetation Used With Biosolids: Biosolids were applied in December of 1988 and the site was planted with turf and trees as prescribed by the Chicago Park District in the spring of 1989 (Photograph 2). Flowerbeds were also established along the north edge of the site along the river. The site has not received regular supplemental irrigation.

Contacts (For More Information):

Dr. Thomas Granato
R&D Department MWRDGC
6001 W. Pershing Road
Cicero, IL 60804

Phone: (708) 588-4063.

Prepared by Dr. Thomas Granato

Photograph 1. Chicago River Park during development stages.

Photograph 2. Chicago River Park after completion of the project.

RIVERFRONT RENAISSANCE PARK

Location: 7500 W. 115th St., Worth, IL

Biosolids Use: Establishment of an athletic field.

Project Date: 1999 - 2000

Size of Site: 18 acres

Description of Biosolids: The biosolids used in this project were anaerobically digested, lagoon aged (minimum 18 months), and air-dried on paved drying cells to achieve greater than 60% solids content. All biosolids utilized in this project met the exceptional quality criteria set forth in the United States Environmental Protection Agency's 40 CFR Part 503 regulation. Biosolids from both the Stickney and Calumet Water Reclamation Plants were utilized.

Description of Soil: The soil that existed on the site consisted largely of compacted material that was excavated from the adjacent Cal-Sag channel during its construction in the late 1800's/early 1900's. This clay textured soil contained a high proportion of pebbles, stones and rocks and was unsuitable for use as a base for athletic fields and for establishing turf grass. Soil material, consisting largely of subsurface fill acquired from off of this site, was placed over the entire site to cover the unsuitable compacted clay. The soil material was applied in a layer that was greater than 1 foot thick. Because this soil material originated from subsurface soil horizons, it was very low in organic matter and had a higher than ideal clay content. A plan was therefore made to mix biosolids with this subsurface soil to manufacture topsoil in place.

Biosolids Application Method/Quantity: Nearly 10,000 dry tons of biosolids were applied to the 18-acre site. This produced a mean application rate of 556 tons/acre, which amounted to a layer of biosolids approximately 7 inches thick across the entire site. The air-dried biosolids were delivered in 20 cubic yard semi-trailers and were unloaded throughout the site in close proximity to where they were intended to be spread. The biosolids were spread with a bulldozer to ensure that a uniform application was made. The biosolids were subsequently disc incorporated with the top six-inch layer of soil. The objective was to produce an equal blend of biosolids and soil (volumetric basis).

Description of Vegetation Used with Biosolids: The site consists of 18 acres, which was transformed into soccer and football fields and a baseball diamond. Vegetation was established by seeding with a mixture of 70 percent tall fescue and 30 percent Kentucky bluegrass.

Contacts (For More Information):

Mr. Wayne De Monbreun
Project Manager
Village of Worth, IL

Phone: (708) 448-4216

Prepared by Dr. Thomas Granato

Photograph 1. Biosolids were spread on the surface and incorporation into the soil by was discing.

Photograph 2. The site was leveled and seeded with a blend of turf grasses.

Photograph 3. Established Athletic Field – The pictures were taken in May 2003

CITY OF BLUE ISLAND COMMUNITY PARK

Location: 120th St. and Division St. Blue Island, IL

Biosolids Use: Establishment of Community Park & Soccer Fields

PROJECT DATE: Started 2000

SIZE OF SITE: 20 acres

Description of Biosolids: Anaerobically-digested, lagoon-aged, air-dried biosolids from the Calumet Water Reclamation Plant were used on the site. The biosolids met the exceptional quality criteria established in the 40 CFR Part 503 regulations of the USEPA, and all requirements of the Illinois EPA's Controlled Solids Distribution Permit.

Description of Soil: The park is established on an area that was used as a pit for landfilling construction refuse and other debris. The site was graded and portions filled in with various types of fill materials such as excavated clayey soils and poor quality rocky soils. After spreading, the fill was disc ploughed to break up large clods of the clayey materials. Then, the site was graded and large rocks and other debris were removed from the surface. After filling, the surface soil that resulted before biosolids application was quite variable due to the wide variability in the types of fill materials used and it has poor tilth to support establishment. Before application of biosolids, earth berms 2 – 3 feet high were built around the site to minimize off-site movement of surface runoff. Photograph 1 shows the quality of some of the fill materials stockpiled on the site before spreading.

Biosolids Application Methods/Quantity: Air-dried biosolids (≈65% solids) were delivered to the site as portions of the site were filled and graded. Biosolids were applied to the site at various rates ranging from 4 – 9-inch depths (300 to 700 dry tons/acre). The biosolids were blended with the surface soil using a rototiller. In some portions, very little mixing of biosolids with soil was done, which resulted in a seedbed of almost entirely biosolids. Some shallow depressions on the site were filled with biosolids only. Photograph 2 shows biosolids spreaded on the site before incorporation.

Description of Vegetation Used with Biosolids: The first portion of the site that was developed was seeded in late October 2001 by slit seeding. The seed mixture used was the United Horticultural Supply athletic game mix (50% Kentucky bluegrass/50% perennial rye). The droughty spring and summer of 2002 caused dieback of the turf in some portions of the site. Those areas and newly prepared portions of the site were reseeded in September 2002. Photograph 3 shows early establishment of turf a few weeks after initial seeding in fall 2001. Photograph 4 shows turfgrass establishment in late fall 2002.

Benefits Obtained from Use of Biosolids: The biosolids improved the physical characteristics and organic matter content of the poor quality surface soil. The surface soil at this site was too clayey, dense, and rocky but the biosolids improved its tilth and productivity by increasing aeration and water holding capacity. The biosolids also supplied nutrients for immediate turf growth and would meet the nutritional needs of the turfgrass for a long time.

Contacts (For More Information):

Mr. John Kaiser
City Landscaper
Blue Island, IL

Phone (708) 878-0273

Prepared by Dr. Albert Cox

Photograph 1. Various types of fill materials stockpiled on the site

Photograph 2. Biosolids spread over fill before incorporation.

Photograph 3. Turfgrass establishment 3 weeks after seeding in fall 2001.

Photograph 4. Turfgrass establishment in late fall 2002.

BLUE ISLAND LITTLE LEAGUE BASEBALL FIELD

Location: 12500 S. California Ave. Blue Island, IL

Biosolids Use: Renovation of Little League Baseball Field

Project Date: August 2002

Size of Site: 0.5 acres

Description of Biosolids: Anaerobically-digested, lagoon-aged, air-dried biosolids from the Calumet Water Reclamation Plant were used on the site. The biosolids met the exceptional quality criteria established in the 40 CFR Part 503 regulations of the United States Environmental Protection Agency, and all the requirements of the Illinois Environmental Protection Agency's Controlled Solids Distribution Permit.

Description of Soil: The soil at the site was clayey and in some places was densely compacted. Before biosolids application, the site was rototilled to a depth of about 4 inches.

Biosolids Application Methods/Quantity: Six semi-trailer loads of air-dried biosolids were delivered to the 0.5-acre field (an application rate of approximately 150 dry tons/acre). The biosolids were spread to about a 2-inch layer over the soil surface using a Bobcat loader. A tractor mounted rock picker fitted with leveling implement was used to blend the biosolids with 2 to 4 inches of surface soil to create a seedbed. After leveling, the field was compacted lightly using a roller to minimize the potential for wind or water erosion.

Description of Vegetation Used with Biosolids: The field was seeded in late September 2002 with about 200 pounds of the Athletic Promix seed mixture which consists of approximately 60 percent Kentucky bluegrass and 40 percent perennial ryegrass. After seeding, the field was rolled lightly. The droughty conditions and lack of irrigation resulted in poor seed germination. The field was re-seeded in late November.

Benefits Obtained from Use of Biosolids: The primary benefit obtained from the use of biosolids on this project was the improvement in the physical characteristics and organic matter content of poor quality clayey soil on the site. Biosolids improved the physical characteristics of the soil in place by decreasing the bulk density and by increasing the tilth, aeration, and water holding characteristics. The biosolids also provided an abundant supply of nutrients that were immediately available for the growth of the turfgrass and the biosolids will act as a long-term storage pool for nutrients that are slowly available to meet the requirement of the turfgrass for a long time.

Contacts For More Information:

Mr. Jim Walsh, Sportsfield Inc.
P.O. Box 651
Blue Island, IL

Phone (708) 371-0917

Prepared by Dr. Albert Cox

Photograph 1. Little League Baseball Field in late November 2002 – the picture was taken 3 weeks after seeding.

Photograph 2. Little League Baseball Field in mid May 2003.

CONTACTS FOR MORE INFORMATION

To learn more about the District, please visit our web site at:

http://www.mwrd.org

Or write to:

Metropolitan Water Reclamation
District of Greater Chicago
Public Information Office
100 East Erie Street
Chicago, IL 60611

For availability of Biosolids, please contact:

Susan O'Connell
Principal Civil Engineer
(312) 751-6550

For technical questions about Biosolids use, please contact:

Dr. Thomas Granato
Soil Scientist IV
(708) 588-4116

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